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REMINERALIZE THE EARTH

Regenerating our soils, forests and health

RECYCLING MINERALS with finely ground gravel and rock dust

ISSUE # 2

SUMMER-FALL 1991 • NORTHERN HEMISPHERE

- **Earth Day Initiative: Dying Forests Remineralized**
- **The New Cyclone Pulverizer**
- **Bringing SR to Costa Rica**
- **Keyline Agriculture**

WINTER-SPRING 1991 • SOUTHERN HEMISPHERE

formerly SOIL REMINERALIZATION NEWSLETTER

REMINERALIZE THE EARTH

Regenerating our soils, forests and health

Recycling minerals with finely ground gravel and rock dust

This magazine is a reflection, forum, round table of ideas, experiences and research of those concerned with networking and implementing soil remineralization. Articles, letters, and photos are welcome and appreciated. We reach an emerging grass roots community network around the world.

EDEN OR ICE AGE Which Will We Choose?

The book *The Survival of Civilization* by John Hamaker and Don Weaver is regarded by a growing movement worldwide as a blueprint for the survival of the Earth, restoring ecological balance and, perhaps, even recreating Eden.

The remineralization of forests, farms, orchards and gardens with glacial gravel and rock dust is nature's way to regenerate and fertilize soils. During an Ice Age, as glaciers grind rock to a fine dust over millennia, a fertile soil is created. Adding finely ground gravel dust to soils is a tremendous boost to organic agriculture and can make it truly viable by adding up to a hundred elements and trace minerals needed by all life and by nourishing the microorganisms in the soil, whose protoplasm is the basis of all living things.

There is evidence to suggest that as forests begin to die off worldwide, giving off carbon dioxide, the climate of the Earth is altered, triggering the transition from the warm interglacial to an Ice Age. We are hastening this process with the burning of fossil fuels. Undertaking the task of remineralization is urgent to restore our agricultural soils and to save the dying forests in the temperate latitudes and stabilize our climate.

On the Cover:

New Trees, New Hopes
Remineralizing and planting trees on Mt. Mitchell are 12-year olds Lindsay Gaster, left, and Leah Wilk of the group EarthDance. Photo by Larry Hoffman. See story on page 10.

CONTENTS

SPECIAL FEATURES

◆ EARTHDANCE INSTITUTE
Rock Dust May Give Trees Dying From Acid Rain A Second Chance
by Ed Brackett 10

◆ RECONNECTING CHILDREN AND OURSELVES WITH THE EARTH
by Richard Lowenthal 12

◆ LETTER FROM DR. ROBERT BRUCK 14

◆ ASSISTING RELEAF WITH FRUIT TREE RESCUE
by Don Weaver 15

◆ THE CYCLONE PULVERIZER
A Breakthrough Technology
by Joanna Campe 16

◆ EDMUNDO KANDLER IN COSTA RICA 18

◆ REMINERALIZING TROPICAL SOILS
Reclaiming Paradise, Restoring Tropical Soils, A Proposal *by Dan Hemenway* 20

◆ KEYLINE CULTIVATION *by Dan Hemenway* 23

◆ A CALL FOR ACTION, PART II
by Fred Wood III and IV 26

◆ DAIRY FARMING AND SR
by George Abermann 34

◆ HOW TO And Other Relevant Info From Active Remineralizers

PERSPECTIVE ON SR AND CLIMATE 5

A ROCK DUST PRIMER 6

POWDERED ROCKS AND STONES CAN SAVE THE PLANET AND OUR LIVES
by Mark Williams 8

HOW WE CAN QUICKLY REDUCE THE GREENHOUSE EFFECT
by Mark Williams 9

◆ REGULAR FEATURES

INTERNATIONAL GRAVEL SOURCE LIST 36

LETTERS AND FORUM 38

NETWORK LIST 44

◆ NETWORKING News From The Remineralization Network

UPJAU
by Basant Agarwal 22

BIO PLUS
A New Source in Michigan
by Rod Lertola 30

NAMASTE GREEN COMMUNITY AND SR
by Bruce Shearer 32

PREPARING FOR GLOBAL CHANGES and SELLING SR TO THE PUBLIC
by Judy Roylance 32

THE FLOWERING OF THE STONE NUTRI-STONE
by Meganne Easling 35

NEW EARTH
by Mark Williams 46

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About and in This Issue...

This is our fifth year of SR networking, initially through *Soil Remineralization, A Network Newsletter* (1986-1990) and now in bringing forth the second issue of ***Remineralize the Earth.***

It is a privilege to share with you my news that many dreams of all these years are coming true. One is that a dying forest be remineralized in the U.S., another that children become involved in remineralization and another, that a remineralized forest be monitored by a forestry expert. These have come true in the Earth Day initiative of The Earth-Dance Instititute. (See story page 10). I would also recommend applying a glacial gravel of the type Hamaker suggests in larger amounts on another section of Mt. Mitchell for comparison to help insure a successful outcome.

Still another dream has come true! We are happy to announce that a *mobile small scale affordable* rock crusher has just come out on the market that will allow remineralization to take off from small scale to large projects. Recently a caller whose company plans to bring out a rock dust supplement this year said, "We were looking for a 1/4 million dollar ball mill to make 'margarine' and we found a machine for under $20,000 that makes 'butter!'" The Cyclone Pulverizer may be the breakthrough we've been hoping for, it utilizes a new technology and is designed by space aeronautics engineer and inventor Richard Ewing. (See story on page 16.)

I've also dreamed of seeing the aspirations of remineralizers take off in business ventures – earning a livelihood and at the same time healing the Earth. It's been frustrating to answer inquiries about "where to buy the stuff" in our consumer-oriented society with, "Well, you have to be a detective and go out and look for it"... Now you can order it from new suppliers if you are in their regions. Not just the fines of a sand and gravel pit, these sources have been chosen specifically for remineralization as in European countries where it is readily found at garden centers.

Many readers of the *Stockman Grass Farmer* responded so enthusiatically to the article by Roger Wentling called "Beware The Magic Bullet," that we're reprinting articles on SR and dairy farming. (p. 34).

Remineralize the Earth would like to share with readers our own aspirations. The time has come to expand our potential in getting the message out. We would like to incorporate as a non-profit organization with a Board of Advisors, allowing us to accept tax deductible donations and seek funding. (p. 45.)

Good News! If you'd like to help us expand tell your local book store or health food store to carry ***RE***, now available through New Leaf Distributors. (p. 45.)

Other networking highlights: I recently went on an exciting trip to Washington. I was invited to a lunch in honor of singer Richie Havens given by Bill Holmberg, head of the Clean Fuels Coalitions, Information Resources Inc. and an enthusiastic advocate of SR. Richie Havens has founded The Natural Guard, with Diana Edmonton as Executive Vice Chairman. They have opened chapters in New Haven, Conn., Brooklyn, NY, Los Angeles, Calif. and Belize, Central America, bringing ecological projects and activities to students such as tree planting. They would like to incorporate SR into their projects.

Another Washington SR advocate, Andrew Euston of HUD brought me together with some folks at the Department of Agriculture, and I was invited to return to speak at a brown bag luncheon with Dept. officials. I was heartened by their interest and enthusiasm.

MAD MAGAZINE
CARTOONIST SERGIO ARGONÉS'
RENDITION OF MEGANNE EASLING
OF NUTRISTONE EXPLAINING TO HIM
HOW REMINERALIZATION WORKS

NO SERGIO.. E.. LET ME EXPLAIN IT AGAIN
ARGONÉS '91.

Sergio Argonés

"Earthworms only like the very finest grind of rock dust, Sergio!"

Please send us news of your SR activities, which inspire the wonderful grapevine this magazine is!

Joanna Campe

Please note that I have not tested the products mentioned in this issue . J.C.

September 28, 1991
University of Kansas

The Kaw Valley Health and Environmental Conference

with
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A Brief Perspective On Soil Remineralization And The Climate

Soil Remineralization

The soils of the entire world have become severely demineralized by erosion over thousands of years. Plants require a continuous intake of minerals, just as we do, and for very similar reasons – calcium to build structural support, iron to carry oxygen, and so on. Plants growing on mineral-depleted soil do not get enough nourishment and so become smaller, less-abundant and less hardy, more vulnerable to the insects, worms and fungi they are prey to.

Remineralization causes a phenomenal growth of the microorganisms in the soil. It increases the nutrient intake of plants. It counters the effects of soil acidity, prevents soil erosion (just for that reason it would be worth applying rock dust), increases the storage capacity of the soil, contributes to the building of precious humus complexes, has anti-fungal properties, and when you spray it on plants it repels insects as well. The plants and trees become highly resistant to insects, disease, frosts, and drought. Remineralization also enhances and speeds up the process of composting, so if you're composting for your garden, consider putting on some rock dust. It can be even more effective than just directly applying it to the land.

For Forests

The results of long term experiments released in 1986 showed that *in a forest where pine seedlings were remineralized, after 24 years the wood volume was four times higher* than in the untreated area.

For Agriculture

The best source of soil minerals is simple crushed gravel dust. In 1976 John Hamaker spread gravel crusher screenings on part of his ten acres in Michigan. The following year, in an area of sparse rainfall and dry summers, *and with no irrigation,* his corn produced 65 bushels per acre, compared to yields of under 25 from other local farms.

Moreover, when independent analyses were done, Hamaker's corn was found to contain 28% more protein, 47% more calcium, 57% more phosphorous, 60% more magnesium and 90% more potassium than the same type of corn grown with chemical fertilizers nearby.

Twenty years ago the USDA published studies which showed that cement kiln dust (a less-satisfactory source of minerals) also produced better crops, but they couldn't understand "what element" in the dust was responsible and dropped the matter.

Don Weaver grew 18-foot pole beans on remineralized soil (Jack and the Beanstalk?) and got *two to four times the normal organically grown yield.* Alan LePage of Vermont grew a crop of carrots averaging 1-1/2 feet long. And there was no insect damage to any of these crops.

Hamaker estimates that on fully remineralized soil, American agriculture could grow *four times* as much food as it is capable of now – or the same amount of food at about one-fourth the cost – and with no pesticides or chemical fertilizers.

The Nutritional Aspect

When we eat food grown on depleted soil we too, like the plants, lose our natural resistance to disease. All the degenerative diseases have been on the rise in America in recent decades. Dietary fat, cholesterol, salt and overly-refined foods seem to be major factors, but a serious deficiency of minerals in our food may be another. Mineral depletion of soils has been found to be directly correlated with death rates. And deficiencies of only one of a number of trace minerals-- copper, iron, selenium, etc. -- have been found in laboratory studies to be associated with an increased risk of cancer. You may want to grow more complete, nourishing food for yourself and your family.

A Global Perspective On Climate

The problem of soil demineralization also has a global perspective. It is known that the Earth's soil becomes demineralized during each interglacial period, the relatively short 10,000- year warm period between each 90,000-year major Ice Age. Consequent decline and death of the world's forests and other vegetation which occurs causes great quantities of carbon dioxide to be given off. The level of carbon dioxide in the Earth's atmosphere has been rising exponentially for the past century. Carbon dioxide and other greenhouse gases trap excess heat from the sun, potentially affecting the world's climate.

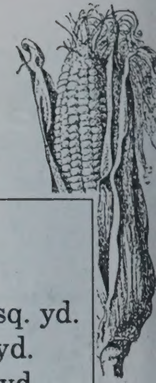
It is also well-known that when the glaciers advance and then recede during each recurrent Ice Age, they grind down rocks in their path, and that their mineral-rich dust is blown far and wide over the surface of earth, remineralizing its soil and causing plant life to thrive again.

John Hamaker has supplied one missing piece of a cosmic puzzle to provide an explanation, long sought, of the awesome 100,000-year cycle of major Ice Ages. Hamaker points out that the greenhouse effect occurs primarily in the tropics, which get the most sun, rather than in the polar regions which get very little. When this happens, the temperature differential between the tropics and the poles increases, resulting in fierce wind systems, hurricanes, tornadoes and storms.

The moisture picked up by these increasing storm systems also is transported to the higher latitudes, where it gets deposited as snow and ice, eventually bringing on glaciation and the next Ice Age. This has been happening in recent years, with record snow cover in the Northern Hemisphere and a shortening of the growing season, by weeks in some places, a pattern which is also accelerating year by year. Hamaker estimates that within a few decades the growing season may have decreased so much that millions of people will starve, in the richer nations as well as the poorer.

The above information is condensed from the writings of John Hamaker, Don Weaver, Larry Ephron and Joanna Campe.

A Rock Dust Primer



What type of rock is best?

Feeding poor soil with mixed rock dust may be compared to feeding an ill person a varied diet of unrefined, natural food. If no one single food is a panacea, it might follow that no single rock type is "ideal". Indeed, the virtue of glacial gravel is said to lie in its broad spectrum of rock types. Hamaker advocates the use of glacial gravel dust, ideally followed by river and seashore gravels and mixtures of single rock types.

John Hamaker suggests finely ground glacial gravel because that is nature's way throughout millenia to create fertile soils. Glacial gravel, which is a natural mixture of rocks, will create a broad spectrum of minerals in the soil in a natural balance.

Much of value can be gleaned from Europe and the research and experiences there (where single rock types and combinations of single rock types are used.) Hamaker's approach, however, may very well offer an even greater potential for an ecologically sustainable and sound agriculture and forestry.

Does it need to be a special kind of gravel?

Again, the analogy of feeding soils to feeding humans in pertinent. From simplistic notions of human dietary requirements as straight protein-fat-carbohydrate ratios, our understanding of specific human dietary needs has grown to staggering sophistication and complexity, and we are now learning that what we don't know may exceed what we do. Similarly, we have come a long way from the simple NPK idea. But no amount of controlled research has conclusively told us (or likely will ever tell us) precisely which minerals specific plants really need and in what precise proportion. The attempt to second-guess nature in all her complexity is sure to be a futile and perpetual game of catch-up.

The above information is condensed from the writings of John Hamaker, Don Weaver, Larry Ephron , Joanna Campe and Solstice magazine.

Approximate Application Rate Conversions

3 tons per acre	=	14 lb. per 100 sq. ft.	=	1.25 lb. per sq. yd.
10 tons per acre	=	46 lb. per 100 sq. ft.	=	4 lb. per sq. yd.
20 tons per acre	=	92 lb. per sq. ft.	=	8 lb. per sq. yd.

Hamaker asserts that:

"microorganisms select what they need to make the compounds of life, and reject to the subsoil what is not needed, [such as] aluminum, silicon, iron, etc., which are generally in excess [in gravel dust]," further pointing to "the Kervran research on biological transmutations", which suggests that biological organisms may play an active role not only in selecting specific elements, but also in modulating their elemental nature to create needed materials where they are in short supply.

Says Hamaker,

"As long as the soil is neutral [in pH] or close to it, microorganisms will control what goes into the plant roots. These controls are off when the soil is acid or acidic chemicals are added."

The Soil

Compost. A very sensible use of glacial gravel dust is in conjunction with compost - recycling of organic matter as well as minerals - and other methods of organic farming. Compost and gravel dust are a symbiotic combination: the compost provides an excellent medium for the "microorganism population explosion" promoted by the dust, and the gravel dust will not only help create more organic matter, but will also help hold it in place and conserve it.

Acidity. Soil pH should be measured annually. If the soil is acidic, agricultural limestone may be added together with the rock dust to bring the soil pH to neutral.

How To Apply Gravel Dust

There are many ways to apply dust to the soil; which method you use depends on the scale and your preference. It can be spread by hand out of a wheelbarrow, by using a manure spreader, sprayed with a mechanical sprayer (use a fine mask to avoid inhaling it in this case). An excellent approach mentioned earlier is to first combine your gravel dust with compost, then apply both together.

How Much to Use

Hamaker says,

"A grower of crops or a gardener needs a good response the first year after a fall application. The response in any one year depends on the amount of minerals available to the microorganisms, soil moisture and the amount of inert organic matter."

"If the last two factors are satisfactory, as little as 3 tons of gravel dust per acre worked into the top 4 inches of soil should give good results. However, I prefer about 10 tons per acre worked in about 8 inches, since one application will eliminate the cost of a number of more frequent applications and give high yields."

The Application Conversion chart above will help you to determine how much gravel dust to use: 3 tons per acre is considered the minimum application, 10 tons per acre is Hamaker's preferred long-term application, and 20 tons per acre is given as a major remedial application, as for especially dry, poor soil. Smaller amounts may be recommended if the rock dust is 400 mesh or finer.

Purchasing Gravel Dust

Gravel grinding operations are common throughout the country. Call your local gravel pit (look in the *Yellow Pages* under Cement-Wholesale, or Sand and Gravel) and ask if they have crushed gravel screenings made from mixed rocks, the kind that comes out of river beds– crushed and passed through a 1/4 inch or finer screen. The gravel dust will probably cost from $1–$8.00 per ton plus the cost of transportation if the gravel pit delivers it to your garden. As most of the cost is in transporting the rock dust, having a truck or access to one is an advantage. A cooperative initiative would also cut costs down.

Particle Size Conversion

Particle	Diameter (microns)	"Mesh"
Fine sand	250 – 100	50 – 125
Very fine sand	100 – 50	125 – 250
Silt	50 – 2	250 – 6000

The Particle Conversion Chart shows various categories of "soil separates" (ground particles) listed with their diameters in microns (thousandths of a millimeter) and their corresponding screen mesh sizes. "Mesh" simply refers to a screen with a given number of holes per inch.

The more finely ground the rock, the more readily will microorganisms have access to the minerals. John Hamaker uses the term "gravel dust" to mean a dust "90% of which will pass through a 200 mesh screen", i.e., 60 microns or smaller.

Testing Your Gravel Dust

"Several people have reported to me that gravel dust does not work or it will have [only] a temporary effect. The don't describe the dust in detail, but I suspect they had very little dust in what they call 'dust'. Know what you are buying or you may be badly disappointed." - John Hamaker

Here are three simple, quick tests you can perform at home:

Pot Test. A pot test will give you immediate, practical proof of what the product will do in the soil. It is a good idea to add the gravel dust to clay pots and plant radishes or other fast growing plants and observe their progress. As John Hamaker writes,

> *"Doing a pot test is the most convincing argument I know of. Anybody can do it. There are testing laboratory grinders everywhere. There is no lag time. In 6 hours you can get a microorganism population explosion. Taking some 6" clay pots, I filled them with a 50-50 mixture of earth and peat and 3 heaped tablespoons of dust. The results were astonishing!"*

You can compare different mixtures or samples of gravel dust depending on what's available in your area. Use a control without rock dust to compare as well. You can also begin with small plots in the garden. You can see the results of the gravel dust you've chosen and then add it in larger quantities to your garden. Work the gravel dust into the topsoil, if possible. By the way, very fine dust sprayed directly on plants and trees has been shown in research in Germany to keep insects away very effectively.

Separate Layer Test. Purchasing a product based on its stated screen mesh alone still leaves room for error. A purchase of 90% or even 100% 200 mesh screenings could contain only sand and silt, and no true dust. A separate layer test will tell you approximately how much of your "dust" is really dust and will be suspended in water.

Fill a clear glass container about half full of [gravel] dust and cover it with about 2 inches of water. Shake it vigorously and let it settle overnight. You can get fairly accurate percentages.

If the container is allowed to stand until the water has dried out, the dust [topmost] layer will shrink to about 1/3 the original measurement and give a more accurate percentage of the dust. Your first observation, however, will tell you if you are buying mostly sand. The coarser the grind, the less effective it will be in the soil, and the more you will need to use per acre.

Moisture Test. *"If the material is bought by the yard, there is a probable increase in bulk when wet...The buyer needs to test so one can know the actual weight of dust one is applying to the land."*

Take a sample, weigh it, then dry it thoroughly in the oven [and re-weigh it]. This will tell you how much of the weight you are buying is moisture.

Chemical Analysis

In most situations, having a formal chemical analysis made is probably going to unnecessary trouble. A pot test and small-scale trials with fast-growing plants will give you more accurate information and with less expense. In cases where you have doubt about its source, you may wish to have a gravel dust analyzed to ensure that it is free of radioactive elements and toxic industrial by-products. In most cases your source will have already had to undergo such testing in order to get a license to operate. This is worth some homework. If you are not able to obtain documentation to your satisfaction, it might be wise to go ahead and obtain your own independent lab tests. A good testing lab is listed in the *International Gravel Sources* section on pages 36-37.

More Tips From Hamaker

◆ *One other thing might be useful. I put about 2 inches of sand on our garden before plowing. It will last a long time and give some yield after the dust is used up. I am sure it has been contributing to what we grow. Unscreened sand (preferably fine sand) from a local gravel pit is much more economical than shipping dust which is mostly silt and fine sand."*

◆ *Sometimes the gravel pits have mesh screens and can measure the exact fineness of the gravel. Though it may be hard to find the ideal fineness– 90% passing through a 200 mesh screen– it may be practical to use even if only 20% or so passes through a 200 mesh screen and at least 50% passes through a 100 mesh screen. You will have the finer material immediately available to the soil and the rest will break down over time. If most of it passes through a 200 mesh screen, it will have a fine consistency like flour or cement. The gravel pit may have machinery to crush the rock finer and may crush it for you.*

◆ *Combining gravel dust with organic materials in compost is a great way to solve application problems and speed up the process. Don't forget a handful of soil to innoculate with organisms. Gravel dust improves aeration and structure and therefore prevents rotting. Gravel dust is assimilated even more quickly in compost than in poor soils.*

Soil erosion is an effect of the shortage of minerals available to support the soil organisms. As Hamaker says,

◆ *"That shortage can be made up on any piece of land in the time it takes to work ground gravel dust into the topsoil. When that is done, the soil microorganisms begin to multiply and it is they who prevent soil erosion by granulating the soil and holding it against both wind and rain."*

We would like to know what results you get from remineralized soil, so that we can improve our knowledge and data-base. Please call or write us. Photos with written reports are welcome and an important contribution to our network.

Powdered Rocks And Stones Can Save The Planet And Our Lives

by Mark Williams

Nearly all soils on Earth are thousands of years old. They are generally quite "sick" and depleted. Astonishingly, stones and gravels, finely pulverized and applied to such soils, can literally restore them. The rocks supply a broad range of minerals – minerals which have been slowly lost through the ages, by erosion, leaching, and farming (mostly "soil mining").

The health of all living things is dependent on minerals. A soil which has an abundance of minerals can really come to life. Given a mineral rich soil, the entire chain of life, from microbes to human, can flourish. With rock minerals, we can renew the earth, benefiting all living things.

Most of the Earth's soils are, indeed, in very poor condition, and getting worse every year. It is important that we be concerned about the state of our soils, because almost all life on Earth is dependent on it. The soil is far more than just "dirt"– it is one of the most "alive" parts of the planet– a thin, delicate skin which countless living things depend on for their minerals, and other essentials.

A sick, depleted soil cannot help but produce sick, depleted plants, animals, and people. The poor flavor of today's foods is only one of the many symptoms of declining soil health. The fact that millions of dollars are spent on condiments, in a desperate attempt to make our tasteless, unappetizing foods somewhat "edible," is no accident.

The symptoms of soil mineral depletion are everywhere, and getting worse each year. Forests are dying in many areas of the world. Crops are diseased, insipid, insect infested, and nutritionally "bankrupt." Soils are compacted, nearly lifeless, and easily eroded away. Plants and trees are stunted, sickly, and sensitive to frosts and droughts.

People and animals are in similar shape. Eating foods from sick soils inevitably leads to sickness. Everything from susceptibility to AIDS or cancer, to "learning difficulties" can often be attributed, largely, to the poor quality of the soil and the foods grown on such soils.

Naturally, the soils haven't always been in such poor shape, as they are now. Five thousand years ago, the situation was quite different. Back then, the soils had an abundance of minerals. The result was an incredible richness of life, everywhere.

The trees in the forests of Europe grew so huge – oak tree trunks were often a hundred feet tall, to the first branch! Imagine an entire forest of such trees, or having much of the Earth covered with them. Incredibly, that's exactly how it was!

But now, after thousands of years of leaching, erosion, farming, overgrazing – plus the more recent assaults with chemicals, the soils are a mere shadow of what they once were. Fortunately, it doesn't have to be this way.

Restoring the Earth

Powdered rocks and gravels are Nature's fertilizer. Glaciers and volcanoes are the primary methods she uses to produce the powder. But those methods are very slow, and the job of remineralizing needs to be done right away. We need to use efficient machines to grind gravel into powder, so that the soil life can get to the minerals that are trapped in the rocks.

When powdered gravel is applied to the soil, a marvelous thing happens. The microbes in the soil (and in the guts of earthworms) "digest" the powder, and extract whatever useful elements they find. The higher plants then extract the mineral rich juices from those microbes, and pass them on to the animals.

Given an abundance of minerals (like zinc, copper, calcium, etc.), and water, the soil microbes, earthworms, plants, and animals can thrive because the minerals are critical to every function of living things. The worms bore miles of tunnels, which aerate the soil. The microbes work extra hard to glue the soil particles into spongy crumbs. The plants develop huge root systems, which resist drought. Insects are repelled by the healthy juices of the plants. Foods become more flavorful and satisfying. Both yields and quality increase. The plants become more heat and frost resistant; diseases become rare events, and so on. The minerals are truly the foundation of all life!

Plants need a balanced diet, just like people do. Too much of a good thing can be very harmful. That's a problem with chemical fertilizers, manures, and many composts--they release too much of some nutrients, and not enough of others (such as the many trace minerals). To make matters worse, those fertilizers are more or less soluble in water, forcing plants to absorb them, throwing the plants out of balance. Powdered rock, on the other hand, is practically insoluble, so there is little chance of an imbalance developing, nor can it pollute the ground water or streams, as farm run-off is now doing.

It should be obvious that powdered rocks and stones could make a world of difference. All we have to do is be generous, giving back to the soil some of what we have taken. The resulting mineral rich soil will give us a great, bountiful reward: a new Earth, full of Life, as it was meant to be.

How We Can Quickly Reduce the "Greenhouse Effect"

With Very Little Sacrifice

by Mark Williams

The Greenhouse Effect is expressing itself more and more each year. 1990 was the warmest year on record, worldwide – in spite of many episodes of destructive record cold. The great drought in California continues with little mercy, and so on.

Currently there are approximately 2,700 billion tons of carbon dioxide in the air. Even though that is barely more than 1/3 of one percent of the atmosphere, it is leading to increasingly destructive climate extremes.

The CO_2 must be reduced by about 700 billion tons in order to return the climate to its original mildness. This reduction must be achieved soon, if we are to have a chance.

Unfortunately at present, the CO_2 is not being reduced. It is being increased, quite rapidly. Fossil fuel burning is adding about 18 billion tons a year to the accumulation in the air. To stop this increase, and actually bring about the needed *decrease* of 700 billion tons will require a great effort, worldwide.

Even a drastic cut in fossil fuel burning and deforestation would only *slow* the rate of *increase*, however. It is not possible to get a reduction in the total CO_2 by those means. Even with an immediate 50% cut in fossil fuel use, and a total elimination of deforestation, we would still end up with a *devastating* 3,000 billion tons of CO_2 in the air in just a few decades, due to the remaining fossil fuel burning, plus forest fires, forest die back, etc.

There is only one way to quickly and economically *reduce* the accumulated CO_2: *We must remineralize and reforest the Earth, on a grand scale!* There is no other option, realistically, if we want to return to a mild climate situation.

More Trees

Reforestation would remove a lot of CO_2 from the atmosphere, if done on a large scale. Trees absorb and store CO_2 by using it to make wood and other tissues – at the rate of about 100 pounds per head, once they are established.

Roger Sedjo, a forestry expert at *Resources for the Future*, has estimated that planting fast-growing trees worldwide on an area the size of the United States, would *remove* the equivalent of all the CO_2 now being produced by both fossil fuels and deforestation; about 28 billion tons per year.

Increased Growth

Remineralizing forests with finely ground mixed rock dust would, according to research, approximately double the trees' growth rates, and also their consumption and storage of CO_2. Therefore, the remineralizing of *newly planted* forests of fast growing trees is likely to boost the above figure by an additional 28 billion tons per year (for a total of 56 billion tons per year removed from the air – a significant portion of the 700 billion tons that must be removed as soon as possible.

Existing forests currently process close to 400 billion tons of CO_2 per year. By increasing their growth rate, remineralizing just one-fourth of existing forests is likely to cause the *removal* of at least an additional 100 billion tons of CO_2 per year.

Renewed Soils

Remineralized soils can remove and store CO_2 in the form of humus and other carbonaceous materials. The annual accumulation could easily exceed half a pound per square foot. On an area the size of the U.S., this amounts to about 18 billion tons of CO_2 *removed* each year.

The Results

The total of all these means of removing carbon dioxide from the air is about 170 billion tons per year. Consequently, we could remove the excess 700 billion tons in approximately four years, using this limited program. (Note that the dusting of large areas of the coastal oceans, and broader applications of the above programs would greatly reduce this required time period.)

If we continue to burn fossil fuels, however, and don't slow down the rate of deforestation, another 100 billion tons will have been dumped in the air by those practices during those four years, thus lengthening the time required to remove the excess CO_2 to close to five years.

The costs of such a massive reforestation/remineralization program would be large. Yet the costs of doing nothing, or acting too late, would be massive in comparison. Already the deteriorating climate is costing many billions of dollars, and there is no end in sight.

In other words, these methods of CO_2 removal are relatively easy and painless. But hesitation may cost us the opportunity.

Mark Williams produces rock dust, New Earth™, (see ad on page 46) and has worked for several years on the development of a rock grinder and the networking of various other remineralization related activities.

ROCK DUST MAY GIVE TREES DYING FROM ACID RAIN SECOND CHANCE

by Ed Brackett

Larry Hoffman

Members of the ecology group EarthDance sprinkle a mineral-rich powdered rock on seedlings newly planted on Mount Mitchell. Studies have shown the dust can be beneficial in reforesting areas like Mount Mitchell that have been devastated by acid rain.

Good news just in time for Earth Day: Help is on the way for the dying trees on Mount Mitchell in North Carolina.

Help is a rock dust from a Colorado quarry – a mineral-rich dust sprinkled on about 500 trees planted Saturday around eastern America's highest peak. Another 500 seedlings didn't get the dust in an experiment conducted by acid rain expert Robert Bruck and assisted by a new Buncombe County ecology group for youngsters, EarthDance.

A similar technique has reforested areas of Europe devastated by acid rain, said Bruck, a N.C. State University professor who has been quoted on the subject on NBC Nightly News, *Nova* and in the *New York Times*.

Bruck and members of EarthDance – about two dozen of which planted fir seedlings in the chilly mist whose pollutants help bring death to Mount Mitchell's trees – have their fingers crossed. Results could show in as early as six months.

"Ultimately, if pollution continues...if you continue to load these eco-systems (with pollutants), then sooner or later the straw breaks the camel's back," Bruck said.

EarthDance founder Mark Fields said the group wants to take some of those straws away. The eight-month old group has members ages 10 to 18 from Asheville-area schools.

The group is "dedicated to restoring a sense of hope in the young people of our county in regard to the environment," he said. "There is a serious disease in young people: hopelessness."

The spruce and Fraser fir trees that cover Mount Mitchell's more than 12 square miles of rolling slopes have died in massive numbers since the 1970's.

About 7 1/2 sq. mi. of Mitchell's trees are now dead or nearly dead, by Bruck's estimates. Lifeless, limbless, needle-like timbers of 25 to 40 feet encase the summit, a popular tourist spot off the Blue Ridge Parkway in Yancy County. Other factors, such as high ozone content and the plant-destroying aphid insect, have worked against the trees, Bruck said. But the acid-soaked mist that migrates into the soil and binds nutrients from tree roots is a major factor in the tree deaths, he said. It's actually the clouds that frequently engulf Mitchell that pose the biggest threat, not the rain itself.

Coal burned at power plants accounts for much of the acidic content of the clouds, Bruck said, followed by car exhaust and heavy industry emissions.

A permanent cure for Mount Mitchell's trees – or dying trees on other western N.C. peaks – is to filter pollutants out of emissions, he said. Adding minerals to the soil can help, but only for an uncertain period of time.

One thing's for sure: More trees will die, even at elevations far below Mitchell's 6,684-foot peak, if nothing is done, Bruck said. "We never know when that is," Bruck said. "People always ask me constantly, 'When is it going to move down? When is Ashville going to be affected? When are all the trees up here going to be dead?' "It's impossible to answer those questions...We never know when that is."

EarthDance also planted trees at Asheville's Beaver Lake Sanctuary, which was dedicated Saturday. More plantings are planned in the future, Fields said. "EarthDance" signifies people's need to live in harmony, to learn to "dance" with the earth, Fields said.

Member Marty Geitner, an Asheville High School student, said he hopes "my generation, everyone's generation who's around now and future generations will see what we've done and see that progress, if there is any, and do something about it."

"I feel like I'm really doing something," Betsy Felder said. "I mean, recycling at home seems like a drop in the bucket, but this seems a little more broad."

Reprinted with permission from the Asheville Citizen-Times newspaper in Asheville, North Carolina. It appeared on the front page of the Earth Day edition on April 21, 1991.

EARTHDANCE INSTITUTE

May 4, 1991
Grandfather Mountain
North Carolina

Dear Friend of these Mountains:

Thank you for joining with us here to share in an effort to restore health and strength to our ailing mountains. Today you are bearing witness to an effort by concerned children, students, parents, teachers, and science that offers hope to all of us that hold reverence for this land, and for all the many life forms that depend on this delicate eco-system for their survival.

Many of the young people that we have brought up to these mountains find themselves shocked and frightened as they experience such a vivid testimony of what we are doing to our environment. As we look out upon these hills of dead and dying trees, it becomes easy for us to understand why many young people today feel apathetic or hopeless regarding the complex problems of our environment that await them.

The environmental challenges of today and tomorrow are great ones; they can and they must be overcome. These challenges can be met only by those of us who understand them, and carry hope, courage and belief in our individual abilities to truly make a difference.

The youth are our future, and will soon inherit this Earth, for better or worse. It is essential that today's young people learn that they can make a difference, and that their contributions do matter. Hope is gained through experience, and that is what today is all about.

Here today our children are learning that through positive action and dedication that they can open new possibilities for their future. They are learning that they are an important part of creating a world of peace and balance for us all. Thank you for joining with us!

Sincerely,

Mark P. Fields, President

Hugh Morton

Mark Fields, founder and director of the EarthDance Institute in Asheville, North Carolina, instructing a group of parents, teachers and students on the reforestation/remineralization project that they are about to begin on Grandfather Mountain. May 4, 1991.

How To Keep EarthDance Dancing

by Mark Fields

You had asked me what EarthDance needs in order to keep dancing into the future with strength. Those needs are as follows, in order of priority:

1. Funding – Money or names of persons and/or organizations that would be willing to support our growth.
2. Computer equipment – a MacIntosh Desktop publishing system, including Laser printer and Scanner. Facsimile equipment.
3. Volunteers around the U.S. wanting to begin an EarthDance office and project in their community.

Adopt-an-Acre

Chief Two Trees, a Native American healer here in North Carolina, called me a couple of weeks ago after seeing the article on our work of remineralizing Mt. Mitchell, and offered me an idea. He recommended that we do as they do with the rainforests, and offer people the opportunity to adopt an acre of land to remineralize once a year with rock dust. We would sell enough rock dust to the adopter to cover an acre, and ask them to commit to doing it once every year or two.

After thinking it over a little, I see the possibilities go on and on. For instance, I wonder if we could get enough people involved sponsoring an acre each year that we could buy enough dust to encourage government-military support in air-dropping the dust over the most severely affected areas to begin with, then expanding. If enough people were to support the program, the government might step forth. EarthDance is considering developing this program for the North Carolina mountains this year. I'll keep you posted.

Editor: A suggestion – Studies showed in Germany that one application in a forest lasted 60 years, using the right amount and source of dust; in that case, 3 tons per hectare (2 1/2 acres) of basalt. This would be less labor intensive over the long term with one application to each acre adopted. Also, military planes could transport dust as a part of their exercises, such as the heavy transport planes that fly in western Mass. over the Quabbin Reservoir as part of their daily manuevers.

Reconnecting Children and Ourselves with the Earth

by Richard Lowenthal

Since August of last year I've been deeply involved in the formation of an innovative environmental youth program called EarthDance.

There are two primary "guiding lights" behind this program: one, that our youth in particular need in-depth and experiential knowledge about our environmental crisis – and about viable, practical solutions and two, the observation that young people are disenfranchised in our society, and are growing up feeling helpless and/or apathetic about their future. They are desperate for guidance, support and hope; for a positive alternative vision, in other words.

In speaking with groups of young people throughout the Asheville, North Carolina area, EarthDance director Mark Fields and I have been astounded and saddened to hear the bleakness of many kids' vision of the future – even among 9 and 10 year olds. When we ask them to imagine the world twenty years from now, we often hear responses like: "In twenty years there won't be any earth", or I see the whole planet covered in black smoke", or "The hole in the ozone layer will keep growing, and we'll all be fried by radiation." They have good cause to be frightened: though our culture voices much concern for our children's future, it is simultaneously devouring the planet and pirating the natural, financial and social resources essential to their future.

Amazingly, environmental education is still considered an educational "frill", and sits at or near the bottom of the totem pole of educational priorities. This error is a symptom of our failed relationship with the natural world. This massive failure in turn translates into failed relationships with our children, since we are initiating them into a social system badly out of touch with reality.

Amazingly, environmental education is still considered an educational "frill", and sits at or near the bottom of the totem pole of educational priorities. This error is a symptom of our failed relationship with the natural world. This massive failure in turn translates into failed relationships with our children, since we are initiating them

Hugh Morton

Earthdance participants Melissa Edwards (left) and Andrea St. Onge (right) of Asheville plant a Fraser Fir on Grandfather Mountain as part of a reforestation/remineralization experiment sponsored by EarthDance.

Richard Lowenthal is an environmental education/outdoor adventure instructor, a psychotherapist, and free-lance writer. He enjoys hiking and spending time near the numerous waterfalls by his Asheville, North Carolina home. He is a member of the EarthDance Board of Directors and has worked extensively with EarthDance Projects.

This article first appeared in the Katuah Journal, *Summer, 1991.*

into a social system badly out of touch with reality. And buying a child off with a new computer or video game doesn't change the underlying truth: if we really cared about the future, and our children, and the world they are inheriting, we would be doing much more than we presently are to deal with the profound social and ecological crises which continue to deepen around us. Within our society and within each of us individually, there exists a pressing need for adaptive change and conscious evolution – a need which we consistently minimize. We need to honor the Earth, to begin again to nurture the awareness that this planet is our Home, that we belong here and are responsible for caring for our Home place.

One way to promote this awareness, and the sense of caring nurturance that it evokes, is through planting trees. This spring, EarthDance sponsored a tree sale and planting project for young people, which was unique in its multi-level approach. This project had three interconnected goals:

1. *Empowering kids (age 9-18) to* ***act*** *on behalf of their communities and their natural environment,* and to literally get "in touch" with the Earth by planting trees

2. *Teaching kids that environmentalism and money-making* ***can*** *coexist, and in fact can support each other.* In this case, 40% of the money raised by selling trees went directly back to their environmental groups or classes in school, to be used for other environmental projects chosen independently by each group. (The remaining 60% of the proceeds covered EarthDance's expenses in coordinating the project.) One group donated its earnings to black bear protection work, while another chose to buy and protect an area of rainforest. Yet another group set its money aside to fund projects of next year's environmental club.

3. *Conducting a scientific experiment based on soil remineralization as a therapeutic technique for healing both soil and trees.* In coordination with Dr. Robert Bruck, a nationally-known expert on acid rain and plant pathology, EarthDance arranged for tree plantings on areas at Mt. Mitchell and Grandfather Mountain that had been devastated by acid rain, acid fog, and by insects and fungi infesting – and killing – the weakened trees. Using a naturally-derived mineral rock dust, study groups remineralized half of the areas where trees were being planted, while the remaining areas were left alone to serve as controls.

> ***We need a drastic "change of heart" even more than a "change of mind", for we know what our situation is, already, and we have plenty of terrifying information about it. What we have need of now is courage, inspiration, and hope.***

Dr. Bruck expects the rock dust to significantly improve the trees' chances of survival, due to its alkalinizing effect on the soil and the concentration of trace minerals it provides for the trees' nourishment. In Germany, large-scale remineralization efforts in the Black Forest have been highly successful in rejuvenating dying forest stands.

Here in Asheville, another experiment is under way on the Audubon Society's new land at Beaver Lake, where kids planted 200 trees – sycamores, hickories, pecans and chestnuts – and remineralized half of them. The sale and planting of the chestnuts is part of a growing regional and national effort to bring back this much-loved tree. EarthDance is also planning future projects to explore whether remineralization can, as Dr. Bruck suspects, minimize or perhaps stop the damaging dogwood blight.

All these efforts are important, yet the *crucial* aspect of the EarthDance approach is the human focus on active involvement and experiential education for our youth. Technical solutions and temporary improvements will not suffice to ensure a sustainable society and a habitable planet. We need a drastic "change of heart" even more than a "change of mind", for we know what our situation is, already, and we have plenty of terrifying information about it. What we have need of now is courage, inspiration, and hope. We need heart-level inspiration to get us motivated, to get us moving, but inspiration never lasts unless it is converted into hope and encouragement *through direct personal experience.*

As Mark Fields puts it, "The problems of our world ultimately spring from our sense of separation from life and each other. The most effective way to heal this sense of separateness is through building connectedness and community: actual involvement in life. In thinking this through, I concluded that our children are the most effective 'acupressure point' within human society to quickly turn things around. Most adults are either so busy or so shut down emotionally that they are simply unavailable for intensive involvement. Our kids, on the other hand, are desperate for involvement, for real participation in life. And the kids have the most to lose, too. They know we need to preserve the planet, but they aren't seeing much real change; they are offered public posturing and 'green' slogans instead. This conveys a negative message to our youth, and increases their frustration and cynicism. And if they don't have a positive outlet for their energy and youthful enthusiasm, they tend to lapse into depression or apathy. But if their potential energy is guided and converted in to activated energy, then they can work to change the direction our planet is heading – and they can feel much better about themselves and their future. Only if a tremendous grass-roots movement arises, among both children and adults, can we move towards right relationship, wholeness, and harmony. I see this movement as one of the bare essentials for the survival of humanity and the planet – and it is happening, and slowly growing, because it is so desperately needed. We need more than anything to reconnect with, and honor, our source."

Mark Fields, President of EarthDance is a former businessman and flower farmer who spent many years living in the rain forests of Costa Rica. He returned to the states in 1988 feeling a deep concern for our social and planetary environment, and spent the past two years developing the ideas behind EarthDance. Phone 704-252-8188, or write to ***EarthDance Institute,*** *P.O. Box 2155, Asheville, NC 28802.*

North Carolina State University
College of Agriculture and Life Sciences
Academic Affairs, Extension & Research

Department of Plant Pathology
Box 7616, Raleigh, 27695-7616
FAX: 919-737-7716

May 3, 1991

To: Mr. Mark Fields - Earth Dance
Mr. Hugh Morton - Grandfather Mountain

I send this message to the EarthDance Community and members of Grandfather Mountain, with my regrets, that I am unable to attend the festivities of tree planting and remineralization at Grandfather Mountain today. Due to the budget crisis back in Raleigh, my presence has been requested at a special meeting of the North Carolina Board of Science & Technology regarding the establishment of an Environmental Research and Policy Center. I felt that it was most necessary for me to be here in Raleigh on this important day.

At this time, I would like to send my greetings and best regards to all the people on Grandfather Mountain who have made the commitment towards reforesting an area impacted by the deadly effects of air pollution, and rejuvenating the soil via the remineralization of the earth. The experiment that is being installed today is not unsimilar to observations that I made in Central Europe during the past decade, where areas impacted by acid rain have been successfully rejuvenated by the application of trace mineral rock dust to the soil. These rock dust applications will have the effect of replacing many of the micronutrients that have been leached out of the soil due to the persistent acid deposition at high elevations over the past 50 years. In addition, it will revitalize soil microorganism populations, which will tend to stabilize and rejuvenate detrimental effects on these high-altitude mountains. Several weeks ago, we installed our first experimental trials at Mt. Mitchell, and today we continue our work on Grandfather Mountain. Following your planting and rock dust applications today, we will track the growth response and health of your trees over time to observe the differences between treated and untreated plots. If our results turn out to be similar to those observed in Central Europe, we may have at least a short-term "magic bullet" for the rejuvenation of these devastated high altitude forest communities. It also must be understood that, indeed, this is sort of like giving an aspirin to a terminal brain cancer patient. We would hope that we can temporarily rejuvenate these ecosystems and buffer out the effects of air pollution. However, only through coordinated efforts to reduce air pollutant deposition to our spruce-fir forest can we ever hope for a long-term amelioration of this tragic situation.

I would also like to send my compliments and respects to Mark Fields and the EarthDance organization for their sincere and genuine efforts in sponsoring and organizing these reforestation and rock dust experiments.

Their organization has proven that pro-active environmentalism not only aids our environment, but also engenders hope and positive activism in dealing with the numerous environmental problems confronting our mountains today. To the students and children on Grandfather Mountain today, I send my regards and best wishes. For what you are doing is truly the beginning of a new dawning of pro-active environmentalism; i.e., let's stop talking about it and let's do something about it! Finally, I send my best wishes and regards to Mr. Hugh Morton and his staff for creating what truly is one of the most outstanding naturally preserved habitats anywhere in the eastern United States. Care and respect for the unique environments of Grandfather Mountain can be seen all around you, and the people at Grandfather Mountain should be complimented for their involvement in the experiments that you install today.

I wish all of you happy planting, and look forward to gathering the data from this important experimental trial – Best of Luck!

Respectfully yours,

Robert I Bruck, Ph.D.
Professor of Plant Pathology and Forestry
North Carolina State University

North Carolina State University is a land-grant university and a constituent institution of The University of North Carolina.

Assisting Releaf with Fruit Tree Rescue

Remineralization Makes a Difference!

by Don Weaver

Thought you'd like a short follow-up report on this year's fruit tree rescue and giveaway to school children on the San Francisco Peninsula between South San Francisco and Palo Alto.

I was again invited by Peninsula ReLeaf (a branch of California ReLeaf) to help out, so I was soon digging up enough mineralized compost to mix with gravel dust (earlier purchased from Rado Rock) for about 1200 anticipated fruit trees. Fellow volunteers Margaret Hall and her students at Keys School in Palo Alto did the weighing and bagging work indoors (while we received some rare rain the week before Arbor Day, March 6th), allowing them lessons in math, soil biology, glacial geology, cooperation, volunteering and Earth Regeneration – at least!

Although I wished we had more dust and compost at the ready, we were all glad that the ReLeaf rescue truck returned from the three Central Valley nurseries loaded with 3600 fruit trees, all of which, with planting and care instructions, found their way into the hands of young friends eager to bring them home to join their families. Maybe to help heal some families, too, as one dedicated teacher told us individuals stories of "broken homes", abuse, drug-related problems, etc. And malnutrition – an almost universal precursor to drug use and living problems? – was as usual a dominant (mal)formative influence on the lives of these essentially angelic young people, mostly about 6–12 years old. At least one teacher who voiced her love for them liked the idea of integrating health, nutrition and home food growing into the daily learning work, and we may be working on further projects such as initiating school gardens (should any school be without one?!).

As noted in the *Peninsula ReLeaf* newsletter, "Words of ReLeaf" about their survey revealed that about 85% of last year's community-donated fruit trees survived, when they were just hoping for about 25%, based on the late rescue, traveling time, planting delays, the inexperience of the planters, etc.

When I reminded them about the gravel dust and compost we gave out with each tree, the ReLeafers agreed that this complete nutritional support was likely the key factor. Of course, based on these two years of sharing a small part of the Abundance of Nature with Her beautiful children, I wouldn't dare underestimate the nourishing and restorative powers of their innocence and love of Life.

Investors Taking Notice of Climate Change

Breakthroughs and Breakdowns

Events that will Change the World in the 1990s

1. *A coming Ice Age?* Throughout the 1980s, scientists and the media worried and sweated over the "greenhouse effect" – rising global temperatures caused by pollution and burning fossil fuels. While politicians and lobbyists licked their chops at the billions of dollars in taxpayers' money needed to study and deal with this new crisis, a funny thing happened. Last summer, temperatures in Europe hit *all-time lows* ..... and no one knows why. (*J.Hamaker did.*)

And some studies have shown that, instead of creating a trap for heat, pollution actually seems to be "brightening" cloud formations so they reflect more heat back to space. Instead of getting hotter...the world may actually be getting colder, trapped in an "icehouse" of bright, heat-reflective clouds.

If this turns out to be the case, it will have profound effects. The demand for oil, gas, insulation – even warm clothing – will go up. Farmlands in many Northern areas will cease to be productive. Unless there is an offsetting gain in formerly dry areas, food prices will skyrocket (bringing starvation and suffering to millions).

Don't count on a new Ice Age... but don't count on the greenhouse effect either. Most scientists can only agree on one thing – that the decade ahead will produce extreme temperature swings and climatic changes.

Excerpted from the ***TAI-PAN Bulletin****, an international private investment advisory publication, January 24, 1991.*

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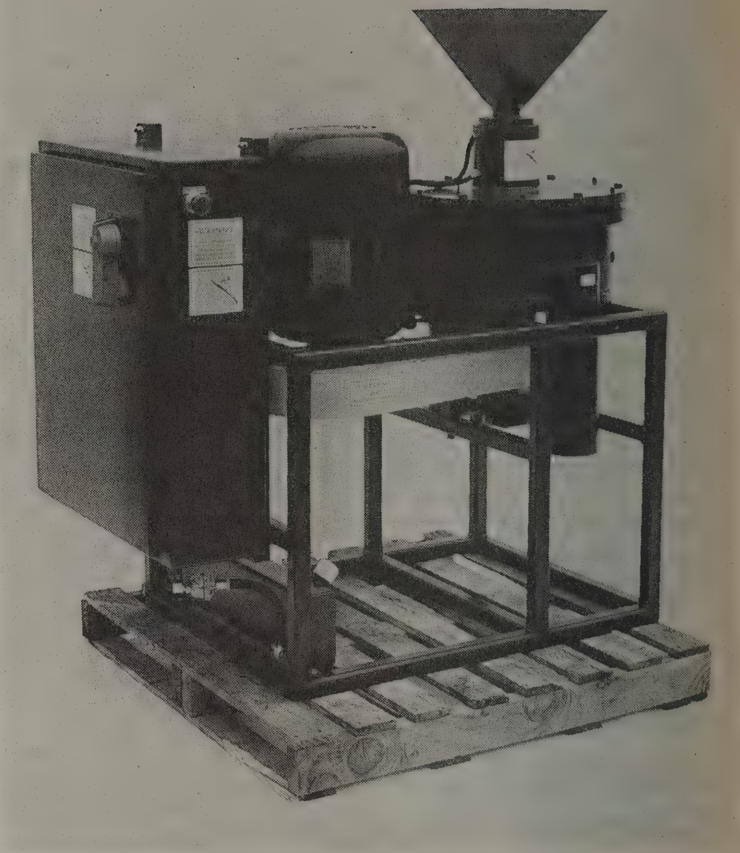
The Cyclone Pulverizer

A Breakthrough Technology for an *Affordable* Rock Crusher

by Joanna Campe

Its versatility, mobility and output truly make it stand out among other grinders available. This may indeed be what we've been waiting for to get remineralization leaping and bounding for small and large scale projects.



As the search for the perfect rock grinder continues, new products are entering the market.

Centrifugal Force, Inc. of Springfield, Oregon, is producing an entirely new type of pulverizer, The Cyclone, which can handle all kinds of rock, minerals and glass, reducing it to any selected size from .25 inch to .325 microns.

This fineness of grind means it can readily produce the quality of rock dust that is being marketed currently in Europe by such companies as Sanvita and Superbiomin in Austria, and Zimmerli in Switzerland. This fine grind is perfect for packaging and distribution of rock dust for gardening centers, for example. Much less quantity rock dust need be applied to the garden when it is so fine, reducing the transportation costs tremendously thereby making remineralization more practical.

The machine's mobility also makes it perfect for an individual or franchise operator distributing rock dust regionally, especially for farmers. Local sources of rock dust can be ground on the spot, saving on transportation costs.

The Cyclone has been hailed as the "missing link" in efforts to remineralize the Earth with powdered rock. In addition, it is applicable to many other uses, including mining, glass recycling, livestock feeding, fish hatcheries, cosmetics and pulverizing coal for power generation. This versatility is a tremendous advantage over other conventional rock crushers for entrepreneurs who have the option to utilize it in various ways. A crushing and automatic feed system for glass, and an automatic feed system for rock are available.

The Cyclone will process about 3 tons per hour of uniform-sized material with less than 20 horsepower (of course, output will vary widely according to size and material used), out-producing a $90,000 Ball machine at a fraction of its operating and maintenance costs. It has only two moving parts, with no metal touching metal, which greatly reduces the wear on grinding parts. This is a feature greatly advocated by engineer John Hamaker and imperative for a well designed rock crusher or pulverizer.

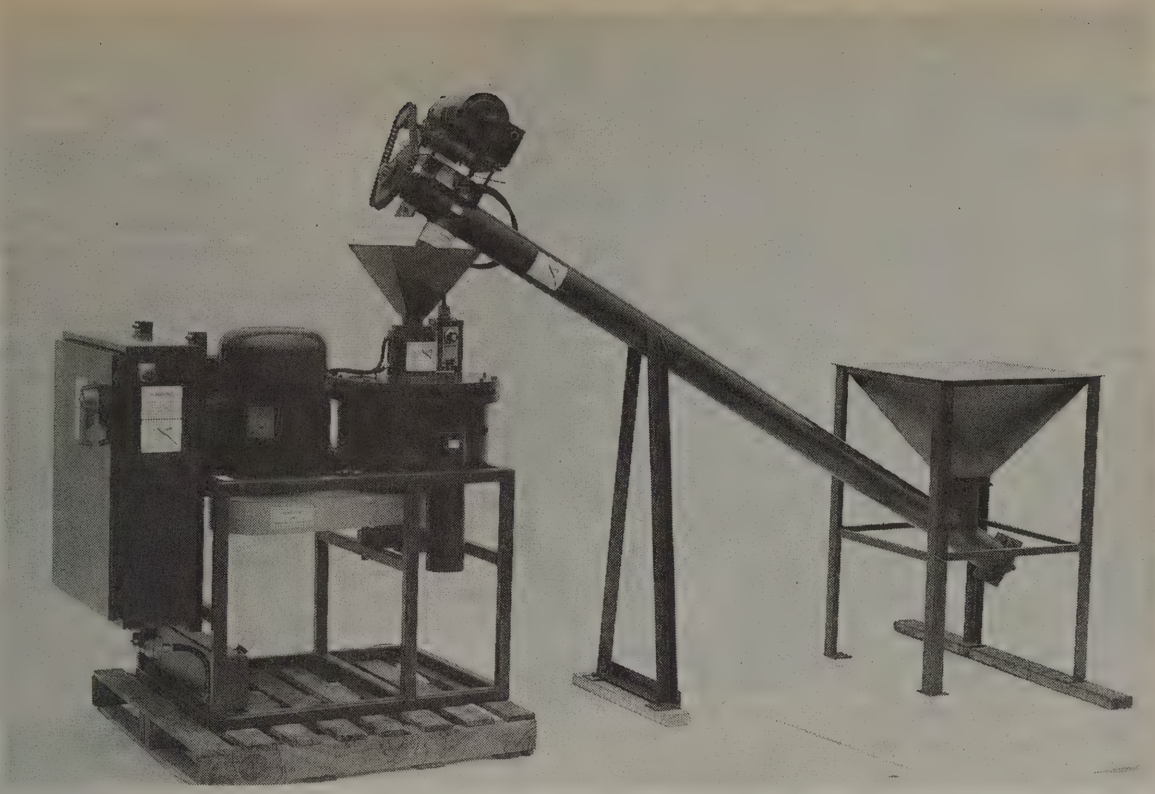
The Cyclone's introductory price of $16,765.45 includes a choice of gasoline or electric engines.

This machine utilizes a completely new method of applying physical force, arising from propulsion experiments conducted for an aircraft company by Richard Ewing. Ewing, a versatile engineer and inventor, devised a way of multiplying the force of gravity by the sum of 17,000.

Mutual friends were responsible for arranging a meeting between Ewing and Geurt Kreutzelman, a Dutch mechanical engineer living in Eugene, Oregon who has designed and built machinery in Europe and the U.S. This meeting soon resulted in prototypes, testing, improvements, changes and new ideas, and finally, a production pulverizer now being marketed.

During the prototype phase, Jack Buker, who has been a national marketing manager for several products, was engaged to do marketing research for the new pulverizer. Buker how heads the sales department for the manufacturing company.

This truly seems like the grinder we've been waiting for.



Cyclone Pulverizer

General Features

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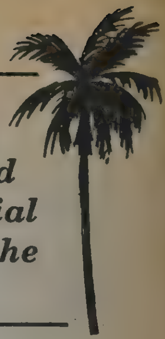
SPOTLIGHT ON

Edmundo Kandler in Costa Rica

by Joanna Campe



International support needed to get crucial project off the ground!

Edmundo Kandler of San Jose, Costa Rica has been a remineralization enthusiast since 1984, when Betsan Coats visited Costa Rica and spoke to the National Assembly. Since that time, sometimes against enormous odds, both economically and through a life threatening illness others might find overwhelming, he has dedicated himself to promoting soil remineralization in Costa Rica.

Edmundo is appointed to the Legislative Assembly as its Advisor Ad Honorem, and is often in close contact with legislators. He is in touch with many ministers and is an influence in saving forests and reforestation projects.

I had the pleasure of meeting him after a few years of correspondence when I attended the International Union for the Conservation of Nature Conference (I.U.C.N. is based in Geneva, Switzerland) in San Jose, Costa Rica with Betsan Coats and her son, David. It took place in February, 1988.

Edmundo had already laid the foundation for our visit to the Costa Rican Ministry, and to meet former Costa Rican President Rodrigo Carazo, founder of the University for Peace.

When Betsan met with Dr. Alvaro Umaña, Minister for Natural Resources, Mines and the Environment, he was familiar with the remineralization concept, thanks to Edmundo. Dr. Umaña was a chemist, understood the importance of soil remineralization and suggested a pilot project under the supervision of Edmundo Kandler. Since that time and through a change of administration, efforts continue to bring forth such a project, through a combination of channels: the government, which though ecologically committed has little funding resources, and through non-profit and entrepreneurial business proposals.

Should remineralization take off in Costa Rica, the importance cannot be overemphasized, since Costa Rica has become an ecological model and the eyes of the I.U.C.N., World Wildlife Fund and many other international organizations including ecologists and scientists are focused upon it. Costa Rica is a kind of theater for ecologically sustainable initiatives and enterprises, and the whole world is watching.

Since much of the research on remineralization is in German, this has not hindered Edmundo, who is of German origin. He has been in contact with Dr. Gernot Graefe of Vienna and other scientific researchers of soil remineralization. He is able to consult with them, greatly facilitating the implementation of soil remineralization plans in Costa Rica.

> ***Costa Rica is a kind of theater for ecologically sustainable initiatives and enterprises and the whole world is watching.***

Costa Rica, with its volcanic mountains is incredibly rich in rock and mineral resources. The most practical approach would be to have many gravel samples from different regions tested through spectrographic analysis, pot tests and trials with specific recommendations from Dr. Graefe, who would also be available as an advisor. (SR research papers by Dr. Graefe are available in the Research Packet. See *Resources* on page 47.)

With the advent of the Cyclone Pulverizer, a powerful low-cost grinder, remineralization can be realistically set in motion with the proper funding.

Some other contributions of Edmundo have been the translation of literature on remineralization in Spanish which has been circulated in Central and South America and Spain; networking in the highest levels of government and with Dr. Franklin Chang, Costa Rican born astronaut, and with ecologically concerned organizations in Costa Rica.

From his correspondence on his most recent networking activities, he writes:

"My friend Dr. Miguel Angel Rodriquez is now Chairman of the Legislative Assembly. He is in favor of soil remineralization. I am sending him today info on status of my efforts of the past 2 years, so that he can evaluate the situation and see what pressure can be put on the government... I am sending info and your magazine to the British Ambassador. I will also approach the Norwegian Ambassador. They are very keen on environmental matters and helping in many ways in Costa Rica, also projects involving children and the planting of trees."

Two possibilities for projects have faded recently. Last issue we reported on UPGROW, a proposed project between Edmundo Kandler with American Greg Stout. Those efforts did not get off the ground for various reasons.

Another promising opportunity has faded somewhat due to the recent Costa Rican earthquake which caused great havoc and economic destruction in the country, but I have confidence that with outside help this latest project can be revived. This is his partnership with businessman Sr. Jorge Alvarado. Sr. Alvarado has been a friend of Edmundo for twenty -five years. He has been Exec. Director of the Coffee Institution. They would often meet to discuss reforestation pro-

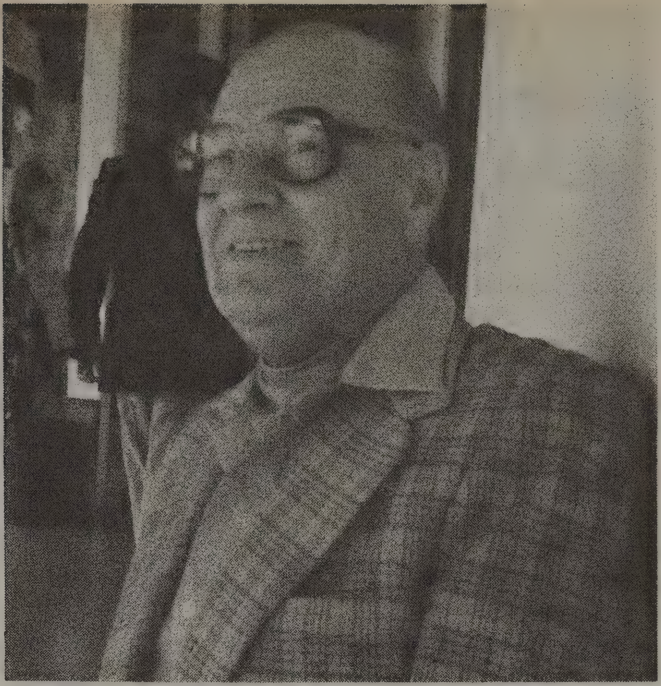
With the advent of the Cyclone Pulverizer, a powerful low cost grinder, remineralization can be realistically set in motion with the proper funding.

jects or investment proposals. Sr. Alvarado writes agricultural articles under the heading *La Voz Agropecuaria,* where he writes much about organic fertilizing, and has also mentioned remineralization in his articles.

Unfortunately a few buildings of Mr. Alvarado were destroyed during the recent earthquake and he is not able to commit the originally planned financial resources and support. This means that support from outside Costa Rica is necessary.

Of the earthquake and the timeliness of soil remineralization, Edmundo recently wrote:

"Rally, try to see what you all would propose to do to help Costa Rica... I have watched carefully TV pictures taken by helicopters and observed, 1) The Earth on the Atlantic coast has risen a half meter or so, while rivers and river outlets are sanded up. NASA is sending specialists down and probably also pictures from the air will be taken. 2) This would concern us: the mountain range of Talamanca has suffered more than was suspected. The highest, most solid mountain range, a pure granite bed, has been damaged. Slopes have been torn open and slid down hundreds of meters. A great and terrible deforestation, and the material, a mix of everything, is accumulating and blocking up rivers. Quickly, dredges will have to clear the masses of materials. Would it be possible for one group of two, three or four gravel dust producers and equipment manufacturers to join in a quick joint venture in Costa Rica? One company will not do too much. And here it is a matter of cooperative and joint effort to do the Costa Rica nation a favor of removing material and at the same time soil remineralization can benefit from open laid rocks rich in minerals. A joint venture is necessary, as much ground material must be stockpiled, that is capital needed to store the huge amounts of rock dust that would be recovered. Then we can really start a terrific advertisement. The material is so much I gather, that Costa Rica enterprises alone can not do it. It needs capital and expertise. However one would involve Costa Rican companies, as courtesy and normal procedure. We would coordinate with the Emergency Commission and get OK by the Resources Ministry. So, a national disaster here can be turned for the benefit of the nation, a profit for the investors."



Edmundo Kandler promoting remineralization in Costa Rica.

———

I have met the current Minister of the Environment, Alexander Bonilla, a few times. I was his translator when he addressed the National Green Conference in Amherst, Massachusetts a few years ago as President of the Greens in Costa Rica. I later had contact with him in Costa Rica at the I.U.C.N. Conference. At that time he was very concerned with pesticide use and chemical fertilizers in Costa Rica and their side effects such as the poisoning of the children, workers, and soil.

The present administration in Costa Rica has a strong ecological commitment, even stronger than that of the previous Nobel Prize winning President Oscar Arias.

Costa Rica is perfect for remineralization. It is an ecologically and economically sustainable alternative for Costa Rica. A lot of groundwork has already been laid by Edmundo Kandler, Betsan Coats and myself. It is interesting to note that Mark Fields, President of EarthDance Institute and a former businessman, grew up on a farm at the edge of one of the national parks of Costa Rica, and is fluent in Spanish. Someone like Mark could also play a valuable role in a project there.

We could use outside help at this time for both entrepreneurial initiatives and non-profit directions to help lift off a project here. With the right grinder now available, small and practical to ship, we could begin.

Please contact me at ***Remineralize the Earth*** if you'd like to help us get a remineralization project off the ground in Costa Rica.

Reclaiming Paradise

George Hadley In Hawaii

by Joanna Campe

Editor: These are some observations made on my visit to Hawaii in the summmer of 1990.

Paradise comes to mind when one thinks of Hawaii. Breathtaking as the islands are, vast areas of beautiful tropical forests have been converted to sugar cane and pineapple plantations over the years, leaving large areas despoiled where fine rich soils once existed.

When the larger companies move on to exploit the soils of the lesser developed countries such as Kenya, some of the land is being reclaimed by small scale organic farmers who rebuild the soils with miraculous rapidity through various methods, including soil remineralization.

Last year on a visit to Kaui, I visited a few of these farms of the future. I met George Hadley at a farmers market in Kilauea at the local Waldorf School.

Set in the hills behind the coastal town of Kapaa is George's farm. There are beautiful panoramic vistas of the surrounding region, from coastal valley to high mountains. Currently he has one acre under intensive cultivation which produces the equivalent of five acres under conventional methods.

The farm lies on old sugar cane and pineapple soil. When he began farming, it was a heavy silty clay, densely compacted and described by the local agricultural services as "inert dust". At the time of my visit he had been cultivating this "inert dust" for 18 months. The soil was so nutrient depleted initially that even wild amaranth and pigweed wouldn't grow; frail plants emerged from the dirt, stunted and chlorotic*. The soil was extremely low in organic matter, for in the tropics the humus burns up as soon as the soil is moved.

George knew that conventional methods lead to soils totally depleted of minerals. He also heard about remineralization, as advocated by John Hamaker, when he saw Larry Ephron's video, *Stopping the Coming Ice Age,* at the local library. (He is part of the Committee for Diversified Agriculture, which sponsored the film.)

George began the transformation from inert dust to rich soil by beginning with the basic advice of John Jeavons; all beds were double-dug two feet deep. He had the soil tested, and found it so low in trace elements of iron, nitrogen, phosphorus, boron, manganese, magnesium and copper that the lab asked him if he "would really try to grow in this?"

George thought that under the circumstances, it would really make sense to add rock dust. He decided to use a blue rock basalt, a dust byproduct found locally on the island, which was very fine. He combined small basalt particles and dust with fish meal, and applied 10 lb. per 100 sq. ft. He also added Clodbuster, a mineralized product also used by John Hamaker (see *Gravel Sources* on page 36) at 5 lb. per 100 sq. ft. Many other techniques were utilized, including green manure, compost and Pfeiffer biodynamic products. A Wood's End Lab soil analysis found

Restoring Tropical Soils

A Permaculturist's View

by Dan Hemenway

Volcanic regions such as Hawaii as well as continental volcanic regions contain huge amounts of minerals in the relatively fresh soils composed of particles expelled from within the Earth. Growing pineapple, and particularly sugar cane, can result in "worn out conditions" even on such young soils, creating dependence on chemical fertilizers for continued production. Generally such soils, while very low in available minerals, are still comparatively rich in locked up minerals. The gardening techniques utilized by George Hadley are likely to make these minerals available in forms that plants can use. Remineralization with rock dust essentially identical to the parent materials of his soil may not have been a major factor in the restoration of fertility in this case, although it certainly did not hurt, and may have made important contributions to cash crops in the first few growing seasons, making the whole project practical.

The critical steps in restoring such soils typically are: 1) restoring soil pH to healthful levels through addition of organic matter, animal debris (e.g. mollusk shell) and/or rock powders. 2) planting "accumulator" species which can extract "unavailable" nutrients from soil minerals and then decompose, releasing them to crops. 3) Incorporation of organic matter to provide energy for soil organisms. 4) Restoring soil porosity by mechanical means, such as double digging, keyline cultivation, or by biological means, such as tap-rooted annuals (organic crowbars) and invertebrate (e.g. earthworms) activity to allow flows of water and air through the root zones; and 5) innoculating the soil with the appropriate fungi, microbes and other soil life which re-the soil was alkaline and had too much potassium. He used foliar sprays of both boron and magnesium, and heavily mulched the lettuces.

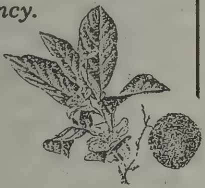
After 18 months, the first-time corn bed produced ears with a 17% Brix sugar reading in a test plot. A Brix reading is a sugar reading which infers a high mineral content and 17% is considered very high. When it is high enough, there are no more problems with disease or insects – insects literally cannot feed on the plant.

George grows 40 different varieties of lettuces and takes them to market with cabbages, bok choy, cucumbers, beans, basil, herbs, carrots, eggplant, kale, corn and the healthful greens like malabar spinach, chervil, sorrel, purple sweet potato and salad amaranth.

When George took over the farm, the grapefruit and avocado trees on the land were nearly dead. Now, with compost, manures and rock dust, I was amazed to see how heavily laden they were with fruit.

George Hadley has truly begun to recreate an Eden on a former pineapple plantation, and remineralization is playing a part.

** Describes yellowing of the leaves due to a chlorophyll deficiency.*



Remineralization of the Humid Tropics: A PROPOSAL

Much of the humid tropics consists of ancient soils, generally clays, from which frequent leaching and millions of years of vegetative growth have stripped all but traces of their original plant nutrients. These are the fragile soils which rapidly desertify when burned for agriculture, or logged for fiber used by the northern industrialized countries. Restoration of these soils to enable them to support complex ecosystems once more is difficult. I know of no successful effort to do so.

Here is an area where soil remineralization may be particularly useful. I propose trials of soil remineralization in a variety of such soils throughout the tropics. Rock powders should be obtained from the nearest available soils. Where river systems are in place, river gravel from the headwaters can be moved downriver via barge with minimal energy expenditure. Rock powders from as many sources as practical can be applied to depleted soils in research farms also using trials of other techniques, including traditional methods of the region and chemical fertilizer farming, to learn what approaches, if any, permit regeneration of lush tropical rainforests, sustainable tropical food systems, and other sustainable land uses. We need bear in mind that while this research will not eliminate the international economic pressures for destroying rainforests, it has a chance of indicating the tools for rainforest restoration, and for decent livelihood of peoples now living in former rainforests, both necessary ingredients to convincing governments and landholders that rainforest restoration must be undertaken.

I would be happy to work with any individual or group which would like to support, sponsor or fundraise for such research projects. We need research in many parts of the world to learn which techniques are generally useful and which are specific to given regions.

A similar research effort is needed to test the effects of remineralization on food and flower production still practiced in some wetlands of Mexico. This technique, refined and developed with measures such as remineralization, may be transposed to other regions where intensive food production can relieve pressure on lands which should be reforested.

Dan Hemenway
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Jacksonville FL 32221

lease nutrients and maintain chemical balance in soil, and further improve its structure. 6) Restoration of the soil microclimate to favor growth of these organisms, typically by providing sufficient moisture and covering the soil with growing plants and/or mulch. And finally, 7) Soil remineralization is sometimes needed.

The techniques used by George Hadley are some of the ways to accomplish these goals. Please consider carefully that while these goals are presented as a list, all of these goals must be met for sustainably healthy soil. By way of metaphor, one cannot have a viable human being while omitting to provide a liver because it is inconvenient to do so.

The techniques George uses are appropriate to "jump start" the soil to work toward sustainability. Once soil health is obtained, however, alternative techniques need to be applied which are sustainable without raiding other regions for nutrients and organic matter. Otherwise, Mother Earth becomes increasingly small pockets of intense fertility surrounded by wastelands. This has been going on since the development of agriculture to support centralized, bureaucratic societies and we are now well past the point where the wastelands created by agriculture are merging and the agriculture centers themselves are desertifying.

Techniques developed in the temperate zones, such as French intensive biodynamic practices, do not directly translate to tropical situations. Mulch and compost break down at astonishing rates in tropical soils and require continuous and massive incursions on surrounding regions to maintain. Continuous ground covers, preferably leguminous covers such as recommended by Masanobu Fukuoka (author of *The Natural Way of Farming*), are superior to mulch. These can be cut in place periodically to add decaying materials to soil.

continued next page

IN INDIA

Finding an Export Market for UPJAU Mineral Fertilizer

by Basant Agarwal

UPJAU is a naturally occurring mineral fertilizer which is found in the state of Rajasthan, India, in the form of natural deposits.

It has all the necessary elements which are essential for balanced growth of plants. Its residual benefits will extend over a few years after its initial application.

Where UPJAU has been used, it has given very encouraging results in increasing crop yields. From a number of field tests carried out to this date, the following assertions can be made:

Its application increases production and nutrition of all crops, green vegetables and fruits. UPJAU is capable of maintaining soil fertility in relation to increased production.

Agronomic trials are required still to determine optimum dosage, methods and time of application to different crops. If you are interested in UPJAU, please contact:

Basant Agarwal, Director
Essex Exports Pvt. Ltd.
150, Sarai Julena, 2nd floor
Okhla Road, New Friends Colony
New Delhi 110025
India

UPJAU Mineral Composition

	Analysis (% by Mass)	Value
1.	Loss on Ignition (LoI)	9.85
2.	Silica (SiO_2)	60.00
3.	Alumina (Al_2O_3	18.95
4.	Iron Oxide (Fe_2O_3)	8.22
5.	Lime (CaO)	0.70
6.	Magnesia (MgO)	0.37
7.	Soda (Na_2O)	0.26
8.	Potash (K_2O)	0.50
9.	Chlorides (Cl)	0.06
10.	Sulphates (SO_3)	0.01
11.	Phosphates (P_2O_5)	0.01
12.	Titania (TiO_2)	0.85
13.	Copper (CuO)	0.16
14.	Zinc (ZnO)	0.01
15.	Manganese	0.01

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Restoring Tropical Soils con't

Intercropping tree crops with annuals and biennials is essential to further enhance soil microclimates. A proper mix of tree crops provides a continual rain of organic matter – "hard" materials such as pine needles which decompose slowly, maintaining the thin mulch, and "soft" materials, such as flower petals, providing readily digested food for soil life.

Woody debris, such as branches and trunks, need be present and can be consciously arranged on slopes to form semi-natural waterbars to improve soil retention and water penetration and provide food and habitat required by some kinds of soil organisms. Shrubs are planted in bands at right angles to contour or to winds, depending on circumstances, to catch organic matter and create mulch-enriched zones. Attention is given to plantings that provide a sequence of food for birds and pollinators year-round and habitat for nesting and cover is assured. Livestock and human interactions are judiciously integrated as well.

The development of such a sustainable system from exhausted and barren soil can proceed from exactly the initial measures that George Hadley has taken. The point here is that the transformation need continue in directions such as I have briefly suggested to achieve a sustainable, indeed paradisial, level of cultivation. This may require several human generations. Therefore, an overall design, flexible but envisioning the basic patterning, is required.

On a final note, as we succeed in remineralizing larger and larger portions of Mother Earth, we need to be increasingly cautious to remineralize only as needed. The energy required to crush and transport rock is too great, and too destructive, to squander. George Hadley was using what was apparently a "waste" product in his area. Obviously it was prudent to scoop it up. However much of the Earth, which long has been arid desert is rich in minerals, as, in general, are volcanic regions. These areas require biological assistance, intervention to assist in the storage, vs. runoff, of infrequent rains in the soil, and relief from pressures from feral animals and desperate populations.

I feel that the remineralization movement sometimes appears in danger of falling into a disastrously simplistic approach. "Remineralize the world and everything will be all right." The spectacular results reported for George Hadley's farm from a wholistic approach to healing our very wholistic, complex and integrated Mother Earth are a good example of the kind of effort needed at the very beginning. And we need to realize that we are in this for the long haul – spectacular beginnings need to be followed by carefully considered and routinely reconsidered long-term development of sites of the complexity required to honor their uniqueness of climate, soil, slope, orientation, winds, sunlight, flora and fauna. In so doing we pay homage to the rich diversity of abundances and forms our Mother Earth offers in every part of her beautiful body.

Keyline Cultivation

A mechanical means for improving soil structure and water retention works well with remineralization, energizing and revitalizing soil while increasing fertility

by Dan Hemenway

In context of the current fad to develop and execute a “sustainable agriculture,” I propound an unpopular view. Whenever the term “sustainable agriculture” comes up in lectures, workshops, and courses, I'm the person who decries it as an oxymoron — a phrase like “military intelligence” or “ethical rape,” so rife with warring internal meanings that its use reflects a minor madness.

Nevertheless, we need a bridge from the broadscale destructiveness of contemporary agriculture to sustainable food systems. This might include home gardens, food parks featuring edible landscaping and community gardens, constructed and restored forage (hunter/gatherer) opportunities, modest home-scale livestock operations based on converting waste to food and so forth – all integrated with provision of other basic needs and amenities according to the model of ecosystem design — all wedded to the energies and flows of specific place, and all integrated into the ambient ecosystem. This wholistic bioregional approach is sometimes called permaculture.

Agriculture Versus Gardening

The distinction between "gardening" and "farming" eludes some people. Try the phrase "The farm of Eden," or better, "The agriculture of Eden," compared to "The garden of Eden."

Most people apprehend here a broad qualitative distinction. The gardener is highly interactive with the garden, while the farmer tends to operate upon the farm, although I know of no absolute cases either way.

Gardens tend toward polyculture, intensive soil management, high efficiency of resource use, large per-unit-area yields, labor intensiveness, and high efficiency of product utilization. Gardeners typically build soil.

Farms tend toward monoculture, extensive soil management or outright mining of soil nutrients, low efficiency of resource use, low per-unit-area yields, capital intensiveness, and considerable waste of product due to mechanization and cosmetic standards. Farmers invariably destroy soil. The distinction is certainly not crisp. One can garden a small farm or farm (abuse) a backyard garden. Yet the distinction is real and useful.

Dan Hemenway

The system of keyline and keyline cultivation developed in Australia by P.A. Yeomans, author of *Water For Every Farm and the Keyline Method,* utilizes conventional equipment and is compatible with conventional farm practice, attitude and economic realities. Yet the keyline approach builds soil on farms where soil was previously mined of nutrients and lost to erosion. The prospect of remineralization with appropriate rock powders promises to make keyline an even more effective tool for restoring fertility, not only to agricultural soils but to lands to be subsequently reforested.

Soil Health Reviewed[1]

Soil requires four constituents to achieve health:

1) air
2) water
3) mineral particles
4) organic matter.

When these four components are properly organized into good soil structure, soil life — fungi, bacteria, yeasts, algae, protozoa, earthworms, insects, etc. — releases fertility to photosynthetic plants which harvest the sun's energy and makes it available to the other soil organisms who eat live or decaying plant and/or animals (which feed on plants) and their wastes.

About one half the volume of healthy soil consists of openings such as pores, earthworm tunnels, etc., which are sometimes filled with air and sometimes filled with water, according to the cycles of rainfall or irrigation and dry weather. This pulse expels air when soil is saturated with water, and inhales fresh air as water empties from spaces due to percolation, evaporation, and transpiration. The tidal effect produced by alternate saturation with water and air in soil spaces energizes soil life and promotes release and uptake of nutrients.

The mineral and organic content of the soil help determine its physical structure, which ideally allows for percolation of water while blotting up enough moisture to sustain soil life between dry periods. A mix of fine (clay), intermediate (silt), and coarse (sand and gravel) soil particles promotes good structure, nutrient holding capability, and

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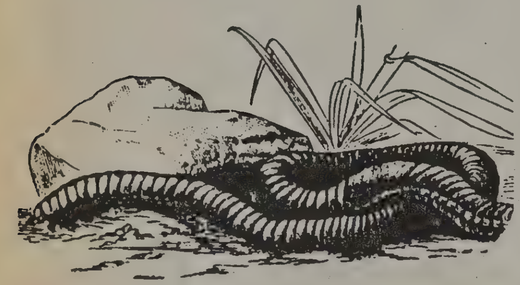
Dan Hemenway is a permaculture designer and teacher who makes his living designing home and community habitats that are ecologically sustainable. He lectures, leading workshops and teaching courses on permaculture and forest ecosystem rescue. He has worked in many parts of the world from northern Ontario, Canada to the Philippines, in most types of ecosystems. He will lead an intensive three-week course in permaculture design from October 18 to Nov. 9, 1991, near Jacksonville, Florida, USA. For details on the course, consulting, or a workshop in your region, you may reach him at: Elfin Permaculture, 7781 Lenox Ave., Jacksonville FL 32221 USA. A self-addressed stamped envelope or international return mail coupon is appreciated.

drainage. However, both dead organic matter and the action and exudates of live soil organisms can promote productive soil structure even where particles tend toward clayey or sandy conditions.

Compaction of soil — where equipment, high density of hooved animals, and/or excessive tillage have compressed soil, eliminating air and water spaces — is a major problem on agricultural lands or on lands where construction or tree harvesting equipment has been used. Much soil life dies in compacted soil, and the remaining soil life tends to be anaerobic — thriving in the absence of oxygen — whereas both anaerobic and aerobic life forms thrive cyclically in porous soils.

On compacted soils, water, which penetrates such soils very slowly, mostly runs off the surface, causing erosion and washing away organic matter, and especially soluble organic compounds of value to soil. Buried organic matter tends to putrify. Root systems are stunted because of the difficulty of penetrating compacted soil, and plants are drastically affected by the suppression of soil organisms that release nutrients, as well as the very limited foraging ability of stunted roots. Nitrogen fixing also is drastically curtailed because the nitrogen-bearing air is very scarce in the compressed soil. The issues are more complex, of course, but from this discussion it is clear that compacted soil is a bad thing.

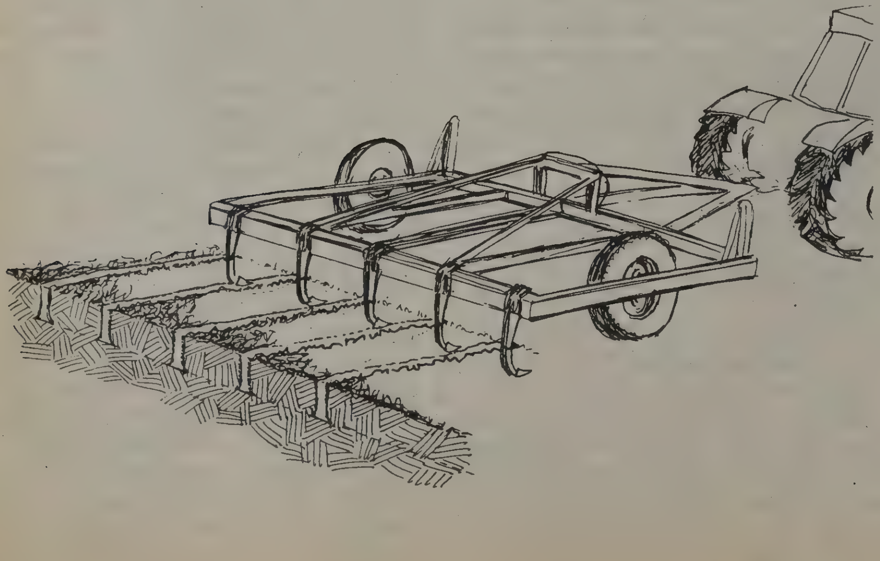


The Keyline Method[2]

Earlier in this century, P.A. Yeomans, who supported his work from farming income, developed a system of cultivating soil and storing water for crop production during rainless periods. The water storage techniques, which are greatly amplified in the permaculture literature[3], are not pertinent here, except to note that supplementary water is often easily harvested and stored, and its availablity can be critical in restoring soil health and productivity.

The basis of keyline is creation of channels in the soil to receive and guide water. These channels, when not saturated with water, also allow air to penetrate the soil.

The channels are produced by plowing with a special kind of implement. A wedge- or torpedo-shaped shoe is attached to the bottom of a sturdy knife. When pulled through the soil, the shoe produces an underground channel or tunnel connected to the surface by the slit made by the knife. A number of these knife-and-shoe implements are attached to a draw bar typically pulled by a tractor. (Horses, mules, water buffalo, etc., can do this, of course.) The resultant plowing combs the soil with parallel slits, each leading down to a channel at the bottom of the slit.



Lisa Barnes

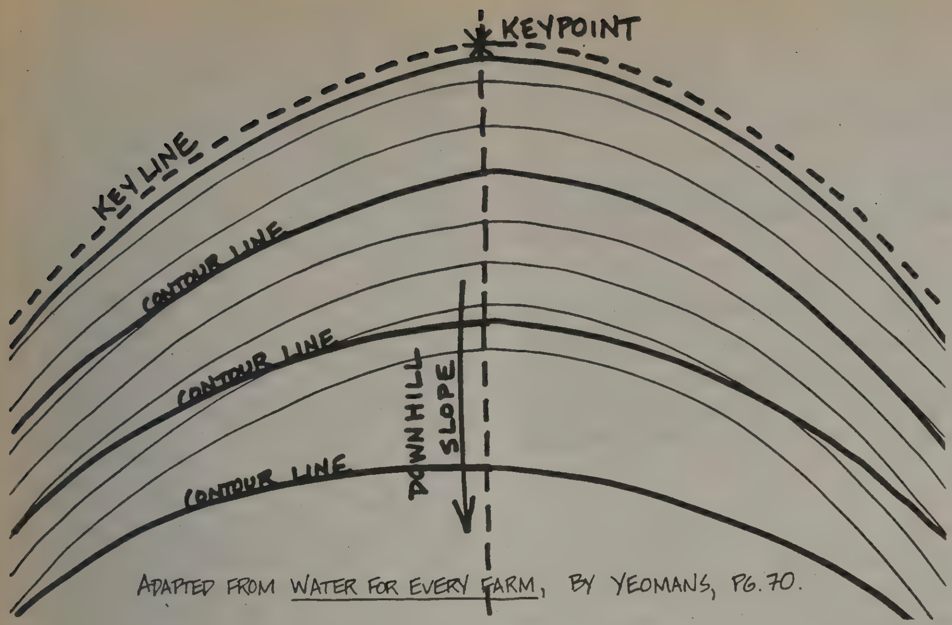
Keyline cultivation offers an ideal way to rapidly remineralize large acreages of cultivated and pasture land.

Yeomans devised a technique for keyline plowing at an oblique angle to most of the coutours on the land so that water usually drifts away from wet spots to drier areas. This is achieved by knife-and-shoe plowing parallel to one contour line—designated the "keyline"—or, when a parcel does not contain a keyline, to a contour line called the "guide line." Because contour lines are almost never strictly parallel, the plowing proceeds at a slightly off-level angle except right at the guide or contour lines. See Yeomans' book for details.

Plowing in parallel passes is easy compared to contour plowing. And the keyline cultivation can be done in combination with any other soil preparation technique that the farmer favors. Furthermore, Yeomans provides practical information to the level of detail that includes the most profitable speed at which to drive the tractor! Hence this is a technique which requires little change in attitude or practice from a farmer who adopts it, and which respects the farmer's need to make a profit to continue in business.

The soil receives conditioning which permits penetration of large amounts of water (avoiding erosion) and air. When organic matter is present, air and moisture permit the soil life to proliferate, and this soil life releases nutrients locked in the mineral particles of the soil.

In broadscale agriculture, the organic matter can be provided by a plowdown green manure crop or by a crop with a large root mass, such as rye. Use of chemical fertilizer in judicious amounts may save years in soil building by providing good quantities of organic matter on worn-out soil. Yeomans claims, and I believe it, that over time the activation of the soil by keyline cultivation builds fertility to the point where even ordinary agriculturalists can phase out chemical fertilizers.



ADAPTED FROM WATER FOR EVERY FARM, BY YEOMANS, PG. 70.

Lisa Barnes

In summary, then, by allowing penetration and storage of water as well as aeration, keyline cultivation stimulates soil fertility, arrests erosion, and improves soil structure. More properly stated, keyline cultivation enables soil life to accomplish these things. To be effective, soil cultivated by the keyline method must be "fed" organic matter to fuel the transformation.

Remineralization and Keyline

Keyline cultivation by itself can restore fertility only to the extent that the necessary minerals are available in the soil particles. While worn out soil may surprise us with the amount of fertility that can be released by keyline alone, it is obvious that the addition of a supply of fresh minerals in the form of rock dust will enable faster and more complete development, *providing that the rock dust actually contains minerals needed by that soil.* Equally obvious is the conclusion that keyline cultivation offers an ideal way to rapidly remineralize large acreages of cultivated and pasture land. The ability of the Earth to absorb rainfall and inhale air, and the energy provided by the ever-necessary organic matter, together, set up ideal conditions for soil life, particularly fungi, to harvest minerals from the dust and make them available to photosynthetic plants. These, in turn, improve soil texture with their roots and feed the soil additional amounts of organic matter. By taking the time to develop soil structure and life through combined remineralization and keyline cultivation, we can greatly increase the rate of tree growth in reforestation projects designed to absorb carbon dioxide from the atmosphere.

Cropland which has been keyline cultivated for three years and then reforested will so favor trees that the time lost in tree growth will be more than made up in another three years. Meanwhile, we have produced food by conventional means while moving on other fronts toward sustainable food systems.

Would keyline cultivation and remineralization constitute a sustainable food system by themselves? Probably not. A sustainable food system must produce more energy than it consumes. Tractors and rock crushers are unlikely to do this. And even if they somehow did produce more energy than they consumed, we still need to operate them with fuels that are renewable. No use of fossil fuels is sustainable.

Less energy-intensive technologies such as use of draft animals for cultivation and application of solar-powered steam engines[4] to drive rock crushers may, in theory, make an agriculture based on keyline cultivation and remineralization sustainable. However, the real value of keyline and remineralization, in my opinion, is that they are techniques we can practically apply *now* to buy time, in the hope that we are not already past the point of no return for ecological collapse.

We can use that time to design for ourselves lifestyles which are in balance and harmony with our bioregions, and which include as a major component healing of the planet's forests, oceans, fresh waters, soils, and atmosphere. *Only when every part of our lives is lived in conscious interconnection with the health of Mother Earth can any aspect of our lives be called "sustainable."* By then we'll probably just use that word when we want to be silly.

Illustrations by Lisa Barnes reproduced with permission from Permaculture in Humid Landscapes Pamphlet II in the Permaculture Design Course Series published by Yankee Permaculture.

Notes

[1] I have written a more extensive treatment of soil health to appear in a forthcoming issue of *The International Permaculture Solutions Journal*, Vol. 1, available from Yankee Permaculture, 7781 Lenox Ave., Jacksonville, FL 32221, USA. Postpaid subscription for 4 issues: $27.50 in the U.S. and Mexico; $30 U.S. elsewhere.

[2] For full details of the keyline method, read *Water for Every Farm and the Keyline Method* available from Yankee Permaculture, address above. Price postpaid to U.S. and Mexico: $16.50; elsewhere $18 U.S.

[3] For details on permaculture see *Permaculture Design Course Pamphlets II* and *XI* as well as *Permaculture, A Designer's Manual* by Bill Mollison, available from Yankee Permaculture, address above.

[4] J. Vanek has designed steam engines for irrigation. These could be scaled-up and applied to rock crushing. For details write: J. Vanek, S.T.E.V.E.N. Foundation, 414 Triphammer Rd., Ithaca, NY 14850, U.S.A.

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REMINERALIZE THE EARTH TO REDUCE CARBON DIOXIDE

A CALL FOR ACTION

by Fred B. Wood, IV and Fred B. Wood, III

*This is the second of two articles – Part One (**Remineralize the Earth,** Winter 1991, pp. 32-35) discussed the importance of remineralization in the context of glacial-interglacial cycles and the need for stronger remineralization programs; part two discusses why remineralization should help stabilize climate by reducing atmospheric carbon dioxide.*

Paleoclimatic (prehistoric climate) data indicate that the Earth is in the late stage of the present interglacial (see *Remineralize the Earth,* Winter 1991, pp. 32-35.[1]) but we are not sure how the natural late interglacial climate process interacts with anthropogenic "manmade" climate forcing due to greenhouse gas emissions and deforestation. We do know that the climate forcing is unprecedented in magnitude and rate of increase; paleoclimate data suggest that the Earth has not faced such a forcing for several million years and perhaps longer. Climate monitoring and modeling are fraught with uncertainties and complexities, leading to a variety of climate change scenarios. Scientific uncertainties may take years to resolve. In the interim, the prudent course of action is to stabilize and then reduce atmospheric concentrations of greenhouse gases as soon as possible. Soil remineralization can play a significant role by helping to increase the global biomass (e.g., forests and vegetation) which through photosynthesis serves as a major sink that absorbs atmospheric carbon dioxide.

The views expressed are those of the authors and not necessarily those of the CSIRI or other organizations with which the authors are affiliated.

Soil Remineralization and Climate Change

Soil remineralization has not yet been widely accepted in part because it has been caught up in the larger debate over the nature and direction of global climate change. The idea of "fertilizing" or "remineralizing" some forest and agricultural soils with high mineral content glacial or volcanic rock dust has recently attracted attention not only for sustainable ("organic") farming, but as a way to increase vegetation productivity and CO_2 uptake and thereby help stabilize climate.

The scientific rationale for soil remineralization, outlined in part one of this two-part [2] series, is based on paleoclimatic and paleoecological data that indicate: (1) the Earth is presently in the later stage of the current interglacial period; (2) during late interglacial stages, soils are substantially depleted of key minerals due to natural processes; and (3) a primary source of "natural" high mineral content fertilizers is glacial and volcanic rock.

Small-scale organic farmers in the U.S., Europe, and elsewhere have successfully used high mineral content rock dust to improve soil quality and vegetation productivity.[3] It is well established that healthy plants and trees require good soil–with adequate mineral content, organic matter, and microorganism activity–that provides nutrients and makes growth possible. Properly mineralized soil is a necessary but not, of course, by itself a sufficient condition for healthy vegetation. Other factors such as temperature, water, pollution, and urbanization all affect the health of plants and trees.[4]

Scaling soil remineralization up from small farms to large geographic areas should increase vegetation productivity and photosynthesis enough to make a significant contribution to reducing atmospheric CO_2, since the global biomass is a major sink for (i.e., absorbs a large amount of) atmospheric CO_2.[5] Remineralization should be an important adjunct to reforestation and sustainable agriculture which are among the most promising opportunities, along with renewable energy (including bioenergy) as a direct substitute for fossil fuels, to help stabilize and then reduce atmospheric CO_2.[6]

Remineralization should help improve the health of already established temperate and boreal forests, augment tropical reforestation programs, and complement a wide range of other organic farming techniques (such as crop rotation, conservation tillage, integrated pest and weed control, and low input irrigation).[7] Remineralized forests and farms should be more resistant to the ravaging effects of drought, insects, acid precipitation, fire, and weather extremes, all other things being equal.[8] As an added benefit, remineralization should help improve human health through more nutritious food.[9]

Additional research is needed, however, to analyze remineralization from three related perspectives: (1) carbon and other biogeochemical cycles of both vegetation and soil, to ensure that atmospheric CO_2 and other greenhouse gases indeed would be reduced through remineralization, all other things being equal; (2) energy and environmental requirements, to ensure that the greenhouse costs of the energy and environmental impacts of sourcing, grinding, transporting, storing, and applying the rock dust would not offset the greenhouse reductions anticipated from increased photosynthesis of the remineralized vegetation; and (3) engineering and technical requirements, including pilot tests, to ensure that remineralization is feasible under a range of soil, vegetation, geographic, geologic, and climatic conditions.

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Fred B.Wood IV is a specialist in global climate and a longtime member of many environmental organizations.

Analyses of a conceptually similar proposal to fertilize ocean surface waters with iron (and thereby stimulate growth of phytoplankton) have identified a significant potential to sequester CO_2 but also possible scientific and practical limitations.[10] We believe that the odds are much better for large-scale soil remineralization to work and that the logistical problems, however challenging, are much less onerous on land than at sea.

In sum, remineralization should help significantly increase the size and health of the biomass, which in turn should result in greater photosynthesis and a lower level of atmospheric carbon dioxide (or a reduced rate of CO_2 increase), all other things being equal. But to date, the debate over the nature and direction of global climate change has diffused or diverted attention from using soil remineralization to help stabilize carbon dioxide levels.

Finding answers to the climate change puzzle is not easy, given the immense complexity of the climate system. This system involves the interaction of many variables: the atmosphere, oceans, cryosphere (snow and ice), land masses, and biomass (plants, animals, humans), as well as solar, volcanic, glacial, and probably other geologic, geophysical, and biogeochemical cycles. Systems science is essential to both modeling and monitoring climate complexity.[11]

More comprehensive climate monitoring is urgently needed--monitoring that reflects the complexity of the "real-world" climate system.[12] For example, zonal and regional temperature trends need to be carefully monitored in order to validate and determine where the hemispheric and global trends are actually occurring. We need to better understand how temperature changes vary by tropical, temperate, subarctic, and arctic zones, and by key climatic regions such as the Tibetan high plateau and Canadian tundra. And monitoring of seasonal extremes (e.g., record high and low temperature, rainfall, snowfall, frost/freeze dates, thaw dates) deserves high priority, since the extreme weather events may have as much or more impact on forests and farms than changes in long-term climatic averages.[13]

Need to Stabilize Trace Gas Concentrations

Despite the uncertainties and complexities of climate change, many global climate researchers emphasize the urgency of stabilizing and then reducing the concentration of trace gases in the atmosphere. These researchers cite the exponential increase in carbon dioxide and other radiatively active trace gases that already are at higher levels of atmospheric concentration than at any time in the last 160,000 years and, quite likely, much longer (probably millions of years).[14] The researchers believe that this increase in trace gases is so large and so rapid that the global climate change will occur on a much faster time scale than a naturally-occurring interglacial-glacial or glacial-interglacial transition. Most researchers believe that if left unchecked, the trace gas emissions and subsequent climate change likely will outstrip the ability of natural and human systems to adapt, with severe adverse consequences for the Earth and its inhabitants (plants, animals, and humans). A minority of climate change researchers remain unconvinced that increasing greenhouse gas concentrations pose a serious threat.[15]

Many global climate researchers also agree that trace gas-induced climate change is likely to occur very rapidly--on the scale of years to decades, not centuries to millennia. They cite the growing paleoclimatic, paleoceanographic, and paleoecological evidence that critical shifts in, for example, wind patterns, ocean currents, and vegetation assemblages can occur in just a couple of decades--even though the full transition from interglacial to glacial conditions (and vice versa) takes millennia.[16]

The fact that the atmospheric concentration of carbon dioxide is increasing more than 100 times faster than natural variability indicated in the paleoclimatic record,[17] and at 354 ppm is already well above the peak levels (of 290-300 ppm) recorded during the last two glacial-interglacial cycles, lends credence to this concern.[18] The early part of this recent increase in atmospheric carbon dioxide correlates in time with the widespread clearing of forest lands for agriculture during the 1800s. The latter part of the increase correlates with the rapid increase in fossil fuel consumption and urbanization during the 1900s, augmented by rapid tropical deforestation since the 1950s.

The paleoclimatic record suggests that a significant (50 percent) increase or decrease in atmospheric concentration of CO_2 from preindustrial levels could destabilize global climate.[19] We have concluded that the interglacial level of atmospheric CO_2 (around 280-290 ppm for the last 10,000 years, until the agricultural/industrial revolutions) is at a critical and quasi-stable threshold.

For much of the last 1 billion years, atmospheric CO_2 and surface temperature were much higher than at present. Over the last 100 million years, CO_2 and temperature declined to the levels that permitted the onset of the Ice Ages over the last 2 million years or so (the "Quaternary"). During the Quaternary, paleoclimatic data suggest many glacial-interglacial cycles, each roughly 100,000 years long with a 90,000 glacial period and 10,000 warm interglacial, on the average. The Earth is presently in the later stages of the present interglacial (the "Holocene") which commenced about 10,000 years ago[20]. During the Quaternary, CO_2 appears to have ranged from a low of about 200 ppm (during the peak of the glacial periods) to a high of about 300 ppm (during the peak of the interglacial periods).

In sum, it appears that the Earth's climate has somehow arrested the long-term decline in CO_2 and temperature to achieve a quasi-stable state that oscillates between glacial and interglacial levels. The Earth's climate has been stable or quasi-stable during the Quaternary apparently because somehow the negative feedbacks in the system dominate and are self-correcting, keeping the climate from getting too cold and glaciated or from getting too warm. However, we have concluded that the climate system is likely to become unstable if pushed very far outside of the Quaternary range.

The feedback effects of stratospheric aerosols (from volcanoes), tropospheric aerosols (from pollution), clouds, and the like, still leave much uncertainty about climate change. Nonetheless, the available evidence from the Phanerozoic (last 600 million years), Quaternary (2 million years), and Holocene (10,000 years) is consistent with our central hypothesis--that major changes in atmospheric CO_2 are likely to destabilize climate--even though the climate feedbacks themselves are not well understood.

Our conclusion is that the prudent approach is to stabilize and then reduce CO_2 (and other radiatively-active trace gases) as soon as possible, at least until we have much better knowledge about precisely what level of elevated CO_2 would be likely to destabilize the climate system. (There is the theoretical possibility that lowered CO_2 could likewise destabilize climate, but this appears at present to be a very unlikely prospect.) We also base our conclusion on the paleoclimatic record which strongly suggests that major climatic shifts can take place in as little as 20 years, and that CO_2 at 354 ppm is already about 25 percent above preindustrial interglacial levels (and 75% above glacial levels). Since we do not know exactly what CO_2 levels might trigger major (and possibly irreversible) climatic change, and by the time we find out it may be too late to take preventive action, the prudent course is to first stabilize, then reduce.

Remineralizing Under Climate Uncertainty

Soil remineralization can be implemented under a wide range of climate change scenarios. It may take many years to resolve climate complexities and uncertainties, but remineralization can be carried out much sooner. As discussed in part one of this two-part series[21] as soil remineralization advocates, we must redouble our efforts to demonstrate and communicate to the research and policy communities that remineralization works.

Overall, the risks of climate change appear to be high, and the outcome seems much more likely to be harmful than beneficial--and possibly even catastrophic--to human civilization. Over the last few thousand years, climate changes of comparable (or perhaps lesser) magnitude have severely disrupted regional or continental human settlement patterns, with major impacts on food, water, health, and the viability of tribes, communities, and even nation-states and empires.[22]

Many climate researchers agree that one of the greatest risks is increased climate variability. The recent rash of record high and low temperatures (and precipitation)[23] cannot yet be clearly attributed to anthropogenic forcing. But these climate extremes provide a foretaste of what might be expected if the global climate were to be sufficiently destabilized. Many ecological and agricultural systems would be severely threatened if weather extremes continued for several years in a row. Indeed, short-term climate variability may turn out to be more important than long-term annual averages.

Thus it is incumbent that, as soil remineralization advocates, we urge remineralization action now to help stabilize atmospheric CO_2 and reduce the risks and mitigate adverse impacts under a range of climate change scenarios. We need to present soil remineralization as one of those actions that will be viable and helpful, regardless of what the climate future may hold. In essence, we need to uncouple soil remineralization from any particular climate change scenario, in order that remineralization may go forward years (and perhaps decades) before the climate debate ultimately may be settled. We have no time to lose. If we wait until climate uncertainties are resolved, it may well be too late to avert harmful consequences for human civilization.

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A Pioneer of Remineralization Brings Out A New Source of Rock Dust in Michigan

by Rod Lertola

> ***Over several years time, while we both worked over our drawing boards, John (Hamaker)... sparked a desire in me that seemed common among my contemporaries. That desire was to somehow leave the Earth in better shape than it was when we inherited it.***

Meridian Environmental Group, Inc. of Okemos, Michigan is committed to establishing mainstream technology and systems that recycle sewage, agricultural, municipal organic wastes into highly mineralized humus. In order to accomplish this it will be necessary to demonstrate the environmental benefits and cost effectiveness of such programs. This mission has proven to require the utilization of not only scientific and engineering principles but also, and almost to a larger degree, psychological and philosophical disciplines as well.

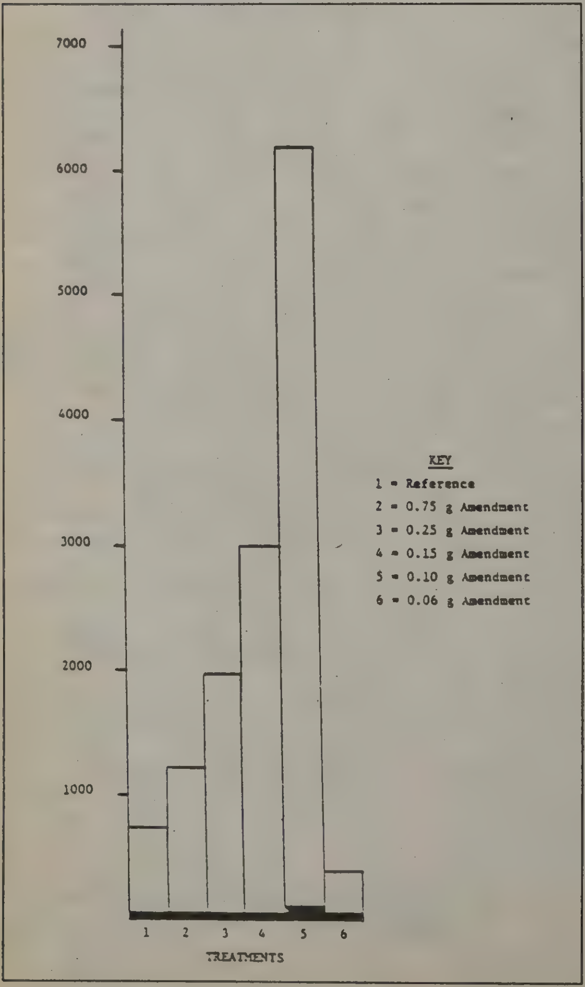

FIGURE 2. Comparison of Dehydrogenase Activity at Day 10 of the Experiment

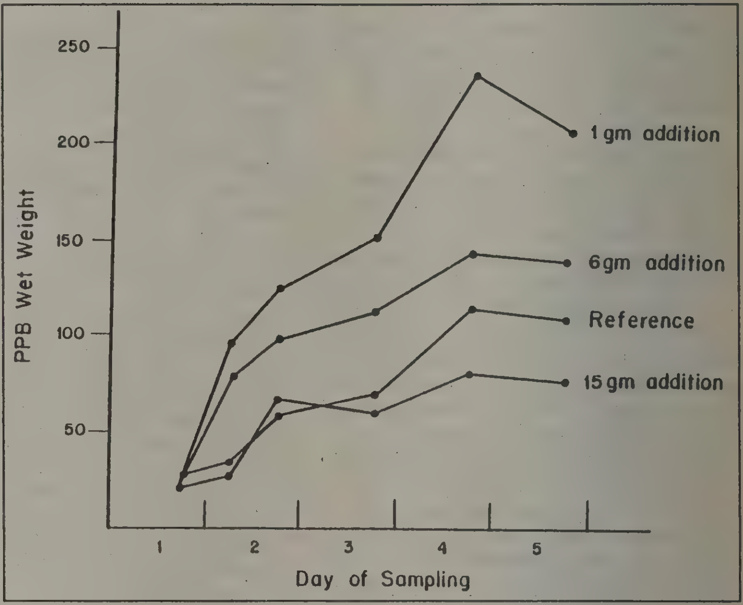

FIGURE 1

Since it is a basic truth that *Natural Systems* work and the Hamaker thesis simply describes Nature's own processes, the key ingredient to achieving our common goal is that of communication. In this respect, we certainly applaud the pioneering work done by Don Weaver, Joanna Campe and the rest of the ***Remineralize the Earth*** Network to expand worldwide consciousness of the Hamaker thesis.

Meridian Environmental Group, Inc. had its foundation established in the late 1960s. At that time, this author had the good fortune to work next to a kindly gentleman as a draftsman, while pursuing an engineering degree at Michigan State University. I soon began to admire this outspoken, creative engineer who was none other than John Hamaker. Over several years time, while we both worked over our drawing boards, John not only educated me on the virtues of "health food" and "revolutionary politics", but he sparked a desire in me that seemed common among my contemporaries. That desire was to somehow leave the Earth in better shape than it was when we inherited it.

During the time of "man's first walk on the moon," John Hamaker was displaying a jar labeled "moon dust" on his desk. Those people who took the time to ask were quickly told that the "moon dust" before them was really pulverized glacial gravel. It wasn't long before I borrowed John's hand rock crusher (actually a steel mortar and pestle). After several hours of blistering my hands and deafening my neighbors, I

> ***Any profits generated by this effort will be used to further develop and promote a full scale integrated system to recycle most forms of organic waste into remineralized earth.***

TABLE 1
BioPlus Average Analysis
% by weight

Potassium	2.100%	Vanadium	.009
Phosphorus	.160	Chromium	.001
Magnesium	4.200	Germanium	.0002
Zinc	.008	Boron	.0002
Iron	1.600	Scanadium	.0002
Calcium	7.000	Barium	.001
Aluminum	11.500	Lead	.009
Silica	20.000	Strontium	.005
Manganese	.160	Rubidium	.0001
Sulfur	.100	Lithium	.0003
Sodium	.800	Cobalt	.002
Carbon	.020	Bismuth	.0009
Nickel	.002	Zirconium	.0015
Molybdenum	.0002	Oxygen	remainder
Copper	.006	Plus 45 ultra trace elements	

All elements are present in compound form, not as free elements.

had a small amount of rock dust. With this material, I conducted my own radish crop experiment and achieved the anticipated incredible results.

This experience lead to the formation of Life Research & Development Co., Inc. and the manufacture and marketing of a product some of you "old timers" may remember--Glacial Grow. In a few short years, Life Research and Development depleted what meager capital it had spreading the word on rock dust. This author reluctantly resumed his engineering career as the only means of support. Nevertheless, many people were introduced to the virtues of ground glacial gravel and had an opportunity to "see for themselves" John's theories in action.

Through the late 70s and early 80s one of my associates continued experimentation, scientific documentation and development of a method to enhance biological sewage treatment processes by the addition of glacial rock powder. Many different glacial deposits were identified and tested to obtain the ideal mineral analysis for the best results.

The results of the Battelle Labs research are graphically represented in Figure 1. It shows that there is a significant increase (approximately 300%) in the biomass of "activated sewage sludge" that has been treated with the proper amount of ground glacial gravel. The increased biomass was measured by increased ATP (Adenosine Triphosphate) activity in the resulting sludge. The increased ATP levels also indicate increased levels of immobilized Carbon, Nitrogen, Potassium, Phosphorus, Sulfur, Magnesium, Calcium, and Sodium (i.e. reduction of pollutants). Another index of microbial activity is to measure hydrogen transfer, by dehydrogenase enzymes in the substrate.

The results of this assay is shown in Figure 2. Even though these results were quite impressive, once again due to our limited financial resources and the ineffective communication networks at that time, most of this documentation had gone unnoticed.

Today, we are grateful to become associated with you, the readers of ***Remineralize the Earth.*** Our company is currently marketing ground glacial gravel (96% passes 325 mesh screen) for home and garden use under the name BIO PLUS™ (see Table 1 for average analysis). BIO 2™ (99% passes 200 mesh screen) is being presented to municipal sewage treatment plants as an immediate method of increasing their operational efficiency, improving their effluent quality and eliminating their problems of sludge disposal by recycling it into highly mineralized humus. Any profits generated by this effort will be used to further develop and promote a full scale integrated system to recycle most forms of organic waste into remineralized earth. The technology, expertise and will exists to accomplish this task. With the proper financial and political commitment it will be done. Meridian Environmental Group, Inc. is committed to this end.

(Editor: for address and more information see page 4)

NAMASTE
A Visionary Green Community

by Bruce Shearer

Namaste Green

Building an entirely new global green society with an economic, political, social and educational vision based on commonly held values and principles is our job as planetary citizens and green activists. We are the peaceful revolution! We are the sustainable future.

Namaste is attempting to be a cooperative, homesteading, permaculture experience with a shared economy. We have 49 acres in central New Hampshire for resident core members and summer camping visitors ($100/month). We wish to put the land into Conservancy/Community land trust and to work towards creating a green village model.

We believe that a sustainable local and global future will demand radical life style changes by millions of us. We are actively seeking 7-8 mature, creative, caring core members. What we do here at Barnstead beyond our current level will depend on who brings what visions, skills and sweat equity.

Namaste and Rock Dust

There is no doubt in my mind that the soil in the New England area is being sterilized by acid rain; hence dying maples and pines. Our gardens require more and more organic fertilizer in order to harvest a healthy return. However, amid this process at Namaste, we began putting rock dust on our gardens 3 1/2 years ago with amazing results.

Our soil is high in clay and parts of the garden are raised beds (in a rather marshy area). For several years we have had heavy summer rainfall. Despite these adverse conditions (we use no pesticides) our pests were rather limited – e.g., slugs, gray squash bugs and a few potato bugs. Clearly the soil is healthier as each year we add locally crushed stone dust from Concord, N.H. However, weeds also love enriched soils, and unless you mulch early or stay with the weeding, your fertilizers may be misplaced. We

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Going Beyond Remineralization: How to Prepare for Global Changes

by Judy Roylance

The most important change we can make right now is a shift in our conscious thinking. In every action, every day, we must learn to think of the Earth first. This planet provides all our needs and requires our protection and preservation. We need to learn to make simple choices which are Earth-centered and life-generative. Take the spider outside instead of squashing it. Spend the extra money for organic strawberries because the Earth was nurtured in the process of growing them. Turn off the air conditioner and open the window. Offer your neighbors a sample of rock dust for their vegetables or for their long-suffering dogwood trees.

Begin to plan to grow as much of your own food as possible. I have begun with perennial vegetables. Remineralize your entire property so that when the time comes the soil will be ready and you will be able to grow food on all of it. In your home add some south-facing windows or skylights for extra sunlight and warmth in winter and ventilation in summer. Consider fuel economy seriously when purchasing your next vehicle. Maybe you could live closer to work or work closer to home. Perhaps you have a hobby you could nurture into a livelihood.

Start with the necessities – food, air and water. Make the assumption that any major system could be nonfunctional for an extended period of time, and all might be nonfunctional simultaneously for short intervals. This would include electric power, public water and sewage, gas and oil delivery, telephone and the food growing and transportation industries. It is obvious that we cannot all be completely self-sufficient, but it is imperative that we be as self-sufficient as possible.

It is a marvelous opportunity to review one's choice of life-style, occupation and geographical location. How much space do I really need to live comfortably? Will a half-acre of well-mineralized soil produce enough food for a family of four? How can I maximize my assets and abilities? Will the equity in my suburban home be enough to finance a move to a more rural location? Once there, will I want to practice my current profession? Are the farmers in the area growing food on remineralized soil? Shall I grow my own food? Can I help others grow food for the community?

Imagine the changes generated when the social consciousness changes from "S/he who has the most toys wins" to "S/he who can produce the most with the least will survive". Surviving the crisis is important; helping others to survive is critical. Thriving as a community, cooperatively surmounting the challenges and creating an Earth-centered society is our collective responsibility. Remineralization is the first step toward renewed cooperation with the Earth and each other.

had great weeds last summer.

For over three years we have scattered nearly 150 tons of rock dust from different areas. One thing we grow prolifically is Sun Chokes – some call them Jerusalem artichokes. Last year we planted very healthy tubers; some in wetland and some on high ground, well-drained and supposedly more fertile. The only difference was that wet areas were near our rock dust pile. So these chokes were "dosed" with minerals. The chokes we planted in the higher, more drained soil had no rock dust. They grew about 2- 3 ft, while the same tubers in the marshy area grew 7-8 ft tall. The chokes near our garden that have very fertile soil grew 10-15 ft tall and you can't get rid of them. They even found their way into our greenhouse.

This year we have 30 tons from Greenfield, Mass. – very, very fine silt. We hope to begin zoning the forest to test for results with our trees. We can see the woods getting weaker each year, especially Gray Birch. This is clearly a result of acid soil resulting from our dependence on fossil fuels. Write us and we'll talk to you about *needless dependence*..

Sterilizing the soils and oceans for profit is something we are all responsible for. The change lies with us. So from Namaste, Happy Dusting. May our future be sustainable.

Namaste Vision

We have five housing units, huge organic gardens, ponds, greenhouses, root cellar, a library, and a summer camping kitchen. We envision a Green Village with extended family clusters based on cooperation and integrity, with private spaces for all residents.

We promote multi-cultural and multi-spiritual creative expression and make our decisions based on consensus. We network with other urban and rural greens. On-going education is part of our vision with special emphasis on children and natural integrity, a school for cooperative living, natural farming and agro-ecology/construction.

Trial membership is for one year. and membership is granted by consensus of the full membership.

Anyone interested, kindly write Namaste for prearrangement, or call 603-776-7776.

Namaste Green
RR2, Box 578
Barnstead, NH 03225
(603) 776-7776

A Report From The Front Lines: Selling Remineralization To The Public

by Judy Roylance

I recently participated in one of those picture-perfect outdoor summer fairs. The day was magnificent. The setting was a public park in a charming old town on the north fork of Long Island. There was a bookseller with environmentally oriented books, kites of every description, and organizations with the message "Save the Bay" or "Preserve our Wildlife". There was even an Indian teepee and a mini-barnyard with baby animals.

And, there was a small red table with a black and white sign reading "Planters II Trace Mineral Fertilizer," with a double row of five -pound jugs, a triple row of two-pound boxes and some plain-looking 50-pound brown bags.

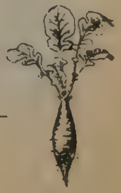
I had an ideal location near the entrance. People would stop as they entered and look questioningly at my rather severe looking display in the midst of all the colorful come-ons. I'd lure them in with a big smile and the question, "Do you have a garden?" There were a few who did not, and if I couldn't sell them a 25-cent sample for their houseplants, they moved on. Once they admitted to having a garden I usually could get their attention. I talked about 31 trace minerals in this all-natural ground rock. I told them about the uniqueness of the alluvial deposit and how they would need two to five tons per acre of other gravel dusts, but only 150 pounds per acre of this mineral-rich product.

When their eyes glazed over I waxed enthusiastically about how good their vegetables would taste and how their roses would be so healthy they wouldn't need to spray.

This woke them up! They were willing to spend money on something good for the soil if they didn't have to spray their roses. This *was* an environmentally sensitive group, after all. It was rare to have someone put money down on the spot. Even a two-pound box was a lot to carry around the fair grounds with a child in tow. They would stop by again on their way to the car, having had their consciousnesses raised by the quality and variety of the other exhibits. They were happy to go home with their jug of fertilizer and do something positive on their own bit of the Earth.

A final note, there were two local farmers at the fair selling their produce; I talked to both of them. The first used only organic methods and was excited about finding a natural fertilizer. He couldn't use any, though, until it was certified organic by NOFA, NY.

The second used only chemical fertilizers and only sprayed "when necessary." He had had his local County Extension Service test for trace minerals and he "didn't need any." He wasn't even interested in buying a 25-cent sample. He did offer to barter fresh lettuce and radishes for a two-pound box. I accepted readily. He has a 60-acre farm; two pounds won't go very far, but maybe he'll be back for more.



Dairy Farming with Rock Dust

by Georg Abermann

Martin Gasteiger in Unterlohen, Bavaria, has been doing organic farming since 1973 and has reduced the cost dramatically. Yearly he uses 10 tons of rock dust at a cost of about $400 a year, and he gets 7000 liters (1 liter= approx. 4 quarts) of milk per hectare (2.5 acres). His cows become 10-years old, or twice the age of the average cow, and have twice as many calves as the average in Bavaria. How does Gasteiger manage to be so successful with so little means?

He tries to take as good care of the soil as possible. He fertilizes only with small amounts of liquid manure (10 cubic meters per hectare) and only if the soil is dry. He collects all organic matter from his farm and household and composts it together with the calves' manure, rock dust and soil, and uses this mixture as nutrients for soil bacteria in fields and croplands.

The liquid manure is especially treated with rock dust in the stable so that organic and mineral substances are combined and no toxicity arises. Then in a special container, a clay/humus mixture is added, and the whole is aerated. This clay/humus mixture is liquid and mixed in a concrete mixer. For every 20-25 cubic meters of liquid manure, one wheelbarrow of clay/humus and some manure compost are added.

Gasteiger says that the bacteria in the humus act like an innoculation so that the rotting bacteria in the liquid manure increase dramatically. The aeration gives the necessary oxygen, while the rock dust and the finely ground clay material from the concrete mixer provide a large active surface to bind toxic elements so they cannot interfere with bacterial growth in the liquid manure. These clay particles also bind nutrients like nitrates so they cannot be washed away in the groundwater.

"Instead of buying expensive liquid manure additives, I make my own", says Martin Gasteiger.

The liquid manure thus treated cannot be compared with raw urine and manure. To prove this, Gasteiger puts his hand in the brew, washes it off under cold water without soap, and holds it under our noses. There is not the slightest smell. Besides that, it does not harm the soil life nor does it burn the grassland, even when the temperature goes above 90° F, and above all, the animals like to eat the grass grown with this manure.

It is applied only in dry weather, under the motto "little but often", about a liter per square meter (10 square feet to a square meter). He succeeds in taking care of the earthworms so they multiply and work for him. The clover remains and manufactures nitrogen through the nitrogen-collecting bacteria at its roots.

He adds 5 dt (1 dt = .10 ton) per hectare of rock dust each year, and every three years he adds 5 - 10 dt of lime. His rock dust is Diabase, a volcanic rock from Kitzbuhl, Austria, with a guaranteed fineness of 0.09 mm., and 1/3 of it is under 0.02 mm. in size (300 mesh or finer).

An employee of the Bureau of Agriculture of Bavaria commented cynically, in an article on Gasteiger's results, that if he had used conventional fertilizers with as much enthusiasm, his profit would be just as great!

In response to this published comment, 26 people wrote letters to the paper protesting this off-hand comment brushing aside Gasteiger's methods and success. They pointed out that people like Gasteiger should get all the help possible, as they do something positive and natural without subsidies.

Cattle Prefer Mineralized Pastures

At the University of Norway on an experimental farm, the eating habits of young calves were examined on differently fertilized pastures with 1) normal liquid manure, 2) aerated liquid manure, and 3) liquid manure treated with mineral fertilization.

Four weeks after the application, the cattle grazed on these plots. Here one could see that the intake was much higher on the mineralized plot than on the others.

In a second experiment, the whole area was opened without separation to all cattle, and also here twice as many animals grazed on the mineralized plot than the others, and it was chosen as well for resting and ruminating. The results were corroborated by an experimental farm near Kempten, West Germany.

Dairy Farming In Mountainous Regions

There is a special problem of fertilizing the topsoil in mountainous regions because of shorter growing seasons, a weaker layer of humus and a harsher climate. The effects of mistakes in fertilizing are all the more visible.

The grass where manure has been applied is used three weeks later for cattle grazing. The manure must lose its acidic quality by that time. It should be absorbed by the soil in three weeks, and the soil life should be enriched by a regular addition of Gesteinmehl (rock dust) at one kilo (2.2 lb.) per 2600 square meters of surface area (860 square ft.) Best of all is to put one kilo of rock dust per cattle per day into the manure in the stable. This dries the area where the livestock stand and reduces the fly population. The soil life is enriched, the earthworms increase and new soil is built up.

Rock dust can also be added to dry manure – as thin an application as possible during the main growing season. The rock dust application increases the assimilation of manure into the soil decisively. With liquid manure, one must be very careful not to add more than 5 cubic meters per hectare (2.5 acres).

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The Flowering of the Stone

NUTRI-STONE
A New Source of Rock Dust in Southern California

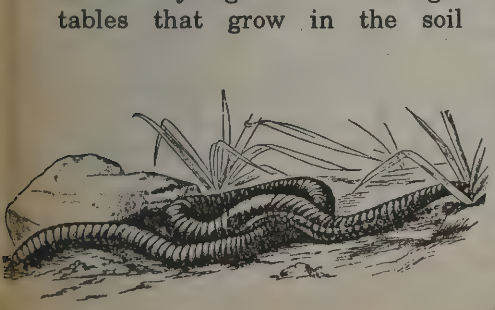
by Meganne Easling

> ***I found a superb difference in the taste of my vegetables. The vegetables that grow in the soil enhanced by rock dust are very tasty and delicious, like I remember vegetables to have been when I was growing up on the farm.”***

I came from a family of gardeners. I learned to garden, to raise my own herbs and vegetables from my mother and grandmother.

On Earth Day, 1990, I saw the video, *The Coming Ice Age*, by Larry Ephron, at the Ojai Foundation in California. It advised the use of rock dust, a full spectrum of natural minerals in natural balance, to remineralize soils that were depleted and contaminated by acid rain and chemicals. It made sense. I began to look for rock dust to use on my garden. It was hard to find. When I asked other organic gardeners where to get some, they said to let them know when I found out. I tested samples of “fines” from eight locations and they all improved my soil, but some worked better than others. I chose the ones that worked best to use and market, starting *NUTRI-STONE* with my business partner, Julie.

The rock dust made my plants stronger against drought and freeze. We had both last year. It stimulated the growth of the secondary roots and the vigor of plant growth. But most of all, I found a superb difference in the taste of my vegetables. The vegetables that grow in the soil enhanced by rock dust are very tasty and delicious, like I remember vegetables to have been when I was growing up on the farm. I am convinced. My earthworms are convinced (they love the rock dust). I hope that farmers, gardeners and foresters everywhere start replenishing their soil with minerals – so finely ground that they are totally available for microbial and plant absorption. They are truly ready to flower into organic life.



As I see it, the plants and animals on the Earth all grow out of the minerals – the stones and the water. Like the flowers, we all grow and bloom and return. The cycle turns, turns, turns.

The ancestors of the "collective unconscious" (and not just the human ones) instruct us to listen; to ask the plants and stones themselves for forgiveness and guidance. They say: plant trees, remineralize the soil, preserve and protect wilderness and agricultural land; act quickly. They say: boundaries are illusions. We – plants, animals, insects, fish, birds and stones – are all one. We blend and mix and move in and out of each other in sacred communion, in the sacred dance of Life, in Beauty, every moment of every day and night. They say: be joyful and love one another. Our hearts break open, and thus we return to the arms of the Great Mother and her grace that sustains the whole of life and joy and wonder. We evolve. Finally, we evolve.

We can be the hands of the planet. We can use our clever inventions to do the work of glaciers and ground stone into flour; to open up the minerals for the gardens and wild places to become nurtured, renewed and healthy again. So the plants, animals and homo sapiens can walk upon the Earth again in wisdom, balance, deep connection and health and totally clean up their act!

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Remineralize your soil.
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For a list of gravel sources in your state (one of the above), send a large manila envelope with 75-cent stamp to David H. Miller, Department of Biology, Kettering 103 Oberlin College, Oberlin, OH 44074-1082.

MINERAL HEALTH SUPPLEMENTS

Boddy Toddy
Rockland Corporation
Tulsa, OK 74128
(918) 437-7310
(800) 331-3659

For **NOVITT** mineral health supplement from a mine in Poland disscovered by Prof. Jan Nowacki call 1-800-522 4279. Rather expensive.

Sacred Spring Marketing
P.O. Box 1226
Park City, UT 84060
(801)649-0322
Clark's Formulas.

See **Elemite** for former Azomite product which may be soon available again as a supplement. **Super Blue Green** algae comes from a remineralized glacier fed lake; from Cell Tech Inc., Klamath Falls, OR, telephone 1-800-321-1303 for a distributor in your area. **KM** is also an excellent mineral supplement based on plant sources. Also, see **Maine Seaweed.**

FOR AGRICULTURE AND FORESTS

NORTHEAST

Maine Seaweed Co.
P.O. Box 57
Steuben, ME 04680
(207) 564-2875
Sea vegetables and garden fertilizer.

Laurence Lynch Co.
Falmouth, MA 02540

The Notch (Lane and Son)
Rte 116
Amherst, MA 01002
(413) 253-2075
A source of traprock, very fine (3-400 mesh) basalt. Recommended for sugar maples. Used and recommended by editor, ideally in combination with glacial mix. Must wear mask if applied dry!

Lane and Son
Attn: Gary
311 East Mt. Road
Westfield, MA
(413) 562-3694
Traprock and a silt and gravel mix.

Lane Construction Corp.
Jim Merold
P.O. Drawer C
Northfield, MA 01360
(413) 498-2956
Glacial till, 54% through 200 mesh. Wet, no mask needed.

Tilcon Massachusetts, Inc.
Attn: Tim Kelly
72 Main St. P.O. Box 114
Acushnet, MA 02743

Tilcon-Arthur Whitcomb
W. Lebanon, NH 03431
(603) 352-0101
Greenstone-meta basalt–They have many sites in NH and VT. Call for info.

Henry Fleischman
36 Union St
Guilford, CT 06437
Contact person for the area.

Judy Roylance
Distributor Planter's II
Trace Mineral Fertilizer
Rt. 1 Box 1398, Dogwood St.
Sag Harbor, NY 11963
(516) 725-1009

Kingston Traprock Co.
Dept. 1
Kingston, NJ 08528
Dia-King diabase rock powder. Write for info.

Flora-Stim
Strite's Warehouse
P.O. Box 128
Greencastle, PA 17225
(717) 597-3325

SOUTHEAST

Mr. Jim Glen
Fairglen Farms
570 Brevard Rd.
Asheville, NC 28806
Sells **Planters II.**

Vulcan Materials Co.
We have not confirmed the quality of the sources listed by this company.
Edmund Redd
P. O. Drawer 1590
Manassas, VA 22110
(703) 631-2060
Various rock sources.

Vulcan
Mickey R Love
P O Box 4195
Winston-Salem, NC 27105
(919) 767-4600

Vulcan
Hal C. Stokes
PO Drawer 8834
Greenville, SC 29604
(803) 277-2371

Davidson Mineral Properties
Gene Rice, Inside Sales
P.O. Box 468
Lithonia, GA 30058
(404) 482-7231
The granite quarry which formerly carried the product **Hybro-tite.**

Vulcan
W. Max Stephens
P.O. Box 80730
Atlanta, GA 30366
(404) 458 4481

Ground Force Intl.
Troy Konnick
1928 NE 154 St. #212
Miami, FL 33162
Rico Verde (custom blended Clodbuster)

Vulcan
Alan C. Stanfield
P.O. Box 7324-A
Birmingham, AL 35253
(205) 877-3642

Vulcan
J. Lloyd Sentell
P.O. Box 7
Knoxville, TN 37901-6001
(615) 579-2903

MIDWEST

Vulcan
Dick Bade
1127 South Chicago Street
Joliet, IL 60436
(815) 726-5285

Brookside Farms Lab
for mineral analysis only
Director Mark Flock
308 S Main St
New Knoxville, OH 45871

Michigan Aggregates Corp.
996 East Chicago Rd
Jerome, MI 49249
(517) 688-4414

Meridian Environmental Group, Inc.
P.O. Box 628
Okemos, MI 48805-0638
(517) 349-9635
Bio-Plus – see ad on page 4.

Vulcan
John T Douglas
500 West Plainfield Rd
Countryside, IL 60525
(312) 482-7000

Vulcan
Daniel Roadruck
P. O. Box 5529
West Lafayette, IN 47906
(317) 743-2175

Mt. Ark Trading Co.
Fayetteville, AR 72701
50-lb bag Organic **NUTRA-EARTH (ELX** Rock dust)
Item 10045. $29.00 + postage

Mark Williams
New Earth Products
Route One
Horatio, AR 71842
(501) 832-2444

WEST

Vital Earth
14941 Daffodil Ave.
Canyon Country, CA 91351
(213) 281-1991

Nutri-Stone
PO Box 268
Ojai, CA 93024
1-800-395-4242 (GAIA)

Be Evergreen
P.O. Box 7101
Carmel, CA 93921

Peaceful Valley
Farm Supply
11173 Peaceful Valley Rd.
Nevada City, CA 95959
(916) 272-4769
Sell **Azomite, Soil-Min**

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Pat D. Kerry
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Trace Minerals
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300 Fremont #113
Las Vegas, NV 89101

Clodbuster- Fertimax
Leland Taylor
701 Madison St N.E.
Alberquerque, NM 87110

Peak Minerals-
Azomite Inc.
101 N. Tejon, Suite 200
Colorado Springs, CO
80903
(719) 635-8000

U.S. Soil
Planter's II
P.O. Box 926
Salida, CO 81201
(719) 539-3535

Earth Circle
Planter's II
P.O. Box 6123
Littleton, CO 80121
(303) 850-0689

We have purchased (on consignment) a large quantity of rock dust in 50# bags from a local supplier.

Elemite
Kelly Park
P.O. Box 57796
Salt Lake City, UT 84121
(801) 278-5328
previously AZOMITE

NORTHWEST

Pacific Rim Soil
Additives Unlimited
P.O. Box 60183
Fairbanks, AK 99706
(907) 479-8941

Rado Rock JB2
Yvonne Rado
P.O. Box 278
McKenna, WA 98558
(206) 458-4188
For California, Oregon, Washington and the Western States.

CANADA

Michael Dean
P.O. Box 2199
Grand Forks, BC VOH 1HO
(604) 442-3745
Distrib. **Rado Rock JB2.**

AUSTRALIA

Australian Mineral
Fertilizer
Hendon Industrial Park
113 Tapleys Hill Rd.
Hendon 5014
Western Australia

Natural Mineral Fertilizer
Norm Todkill
21 Blackwood Ave.
Morningside 4170
Brisbane NSW
tel 07 399-1230

AUSTRIA

Bioglück
A-3950 Wielands
tel 02852 2414

Diabaswerk
A-5760 Saalfelden
tel 06582 2373

Firma Diwoky
Frachtenbahnhof Gersthof
A-1180 Vienna
tel 472241

Firma Gleichenteil
Gleichentheilgasse
A-1230 Vienna
tel 672193, 672194

Kärnter Basalt
Kampach, St. Paul
Lavanthal

Konrad Planegger
Diabas Werk
A-9134 Launsdorf
tel 04213 2044

Sanvita
Hartsteinwerk Kitzbühel
Attn: Mr. Abermann
Postfach 44
A-6370 Kitzbühel
tel 05356-4333-0

Robert Schindele
Furnierwerk
Superbiomin
Kicking 18
A-3122 Gansbach

FRANCE

Societe de Carrieros
de St. Nabor
67530 Ottrot
St. Nabor
tel 88958114

GERMANY

Basalt Vertriebgesellschaft
mbH and Co KG
Südniedersachsen
Bramburg,
D-3404 Adelebsen

Basaltwerk Wiesau/Opf.
250 Maclellan Bldg.
Triebendorf

Firma Ernst Otto Cohrs
Lava-Union
D-5485 Sinzig/Rhein
Kölner Str.22
Tel: 02642-4010

Porphyrwerke Weinheim
Shriesheim AG
Postfach 1609
D06900 Weinheim

Schotterwerk
D-7613 Hausach/ Hechtsberg

SWITZERLAND

Bertrand Rime
1751 Middes
Fribourg
tel 037 681335

Bioticino
V. Gautschin, V C Molo 1
6500 Bellinzona, Tessen
tel 092 262 984

Firma Otto Gamma AG
Seestrasse 336
8038 Zurich
tel 02 832765

Johann Wenger
Muller Poffetmuhle
1717 St. Ursen
Fribourg tel 037441173

Maurice Schillinger
Garten Center, Rte Suisse
1196 Glant, Vaud
tel 022 642267

Wytor SA
1628 Vuadens, Fribourg
tel 029 28280

Zimmerli
Mineralwerk AG
Hohlstrasse 500
8048 Zurich
Tel 01/432 10 40

UNITED KINGDOM

List of 80 quarries in U.K.
Redland Aggregates Ltd.
David Langley
Technical Manager
Bradgate House, Groby
Leics. LE6 0FA

College of Soil Research
Eileen Moore
5 Chase Side Place, Enfield
Middx. EN2 6QA
tel: 01 363 8615
Sells several kinds of rock dust for agriculture, and Austrian **Superbiomin** mineral powder for internal use.

INTERNATIONAL

Exciting News From Costa Rica

As of today I can announce with great joy and relief that a fine professional Agronomist, Jorge E. Alvarado Q. has joined me, as agronomical director in the works, be it in the possible Foundation or in a commercial enterprise. His address is:

Representaciones J.E. Alvarado Ltda.
Apdo. 139, "La Voz Agropecuaria"
2120 San Jose, Costa Rica
Tel. (506) 40-53-70, FAX (506) 24-6895

I have known Jorge since 25-30 years ago, when he was Exec. Director of the Coffee Institution. We met sometimes when I offered him reforestation projects or investment proposals. He writes agricultural articles under the heading La Voz Agropecuaria; he wrote much about organic fertilizing, and even mentioned stone powder. He runs 2-3 sales outlets and also offers agricultural equipment. He will start an SR data file on computer. He has nearby a private enterprise where he can get soil analyses and stone analyses.

The latest magazine is great. Congratulations. A small addition: The man who gave the address of Dr. Franklin Chang, NASA Astronaut was I. In Costa Rica I handed to him a stack of SR literature and then informed friend Betsan Coats, who then stepped in immediately.

Edmundo Kandler S.
Apdo. 2569-1000 San Jose, Costa Rica

Editor: Since writing, due to loss of a few of his buildings to earthquake damage, Mr. Alvarado may not be able to participate financially at this time. Don't hesitate to write Edmundo Kandler if you'd like to help further SR in Costa Rica or support his efforts. See story on page 18.

More from Costa Rica

I contacted Mr. Edmundo Kandler of UPGROW. *Remineralize the Earth* is great. Full of practical ideas and opening large windows to new friends and perspectives, all directed to save our beloved Earth.

I am a Belgian-born, (Flemish) Natural Medicine Doctor, now living as a Catholic priest contemplative hermit in my farm surrounded by a 4-acre forest. I intend to open my 20 acre farm – at 1000 meter altitude in a beautiful scenic position, 30 km from the Pacific Ocean in the south of Costa Rica (near San Isidro de El General), as a food self-sufficiency demonstration garden. And in the near future collaborate in creating, near San Jose, the first Holistic-Natural Medicine Health Spa-Hospital of Central America. (I built and directed one for 10 years in Honduras, near the Nicaraguan border among the Chorotega Indians, but had to give it up during the Sandinistas-Contras fighting.

It was after reading the fantastic *Secrets of the Soil* that I am anxious now to switch our organic farm into a SR farm under your guidance.

Padre Antonio Lootens
San Isidro de El General
Costa Rica

From El Salvador

We are an as-yet-unfunded appropriate technology program centered at Caserio Los Calderones in northwestern Aluachapan Dept. In addition to potable water, health care facilities access and assured education, our primary goal is agricultural diversification!

We very much enjoyed *Remineralize the Earth* (Winter 1991) which we have seen. I only wish our financial resources were such that we could subscribe.

Do you have any information about volcanic dust? It would seem to me that it ought to be rich in all of the elements most needed, plus have an abundance of the traces.

Don Yarbrough, La Loma Project
Apartado Postal #1, Sonsonate, El Salvador

Editor: See articles by Dan Hemenway on remineralizing tropical soils. We are also sending the next few issues of RE, donated by us.

Spain

After reading *Secrets of the Soil* I am interested in furthering the plan of Remineralization here in Spain. I need information, a network of people in Europe and access to Azomite or some equal preparation. For the moment please register me as a member and send the present newsletters as well as past issues on hand.

I have a small piece of land (an acre) near the Mediterranean Sea. There are people around Spain who would be interested in a collaboration... How could we link up here?

Ruth Cory
Tarragona, Spain

The Challenge of Finding a Source of Rock Dust in India

I have contacted the National Mineral Corporation. They have huge stocks of rock dust, cheap, but transport charges are very high. Anyway I am now having pot tests. I dropped "Upjau"; it is just too costly, and the results of the pot tests were mixed. Even if the Paana (NMC) rock dust works out to be positive, the transport costs will make it impossible for farmers here to even think about it.

Upjau costs 7500 Rupees/ton +1500 Rs. transport; it is not so fine as to pass 200 mesh. Paana costs 20 Rs./ton +1000 Rs. transport, and only a little passes 200 mesh. That is before the recent crisis. With diesel scarcity, I wonder if we can get it at all.

An average income of 20 Rs./day is quite good here for farmers. A lot are earning less. I give this context so you can understand that farmers cannot do remineralization at these prices. We need to find some close-by source, and the search continues.

But it is not in my nature to give up easily. I proceed patiently but steadily. I keep on passing the cassette *The Snowball Plea* or talking about it, and spreading the info. Even if we here are not to succeed, others might find it easier...just that it gets done somewhere in India.

Bernard
Auroville, India

Raising Interest on SR in India

I am very impressed with the latest issue of *Remineralize the Earth*. I immediately went through it cover to cover and read some interesting letters, experimental designs, etc. I liked the idea of providing experimental designs because that will help non-governmental organizations to lay out properly conceived design.

In India, Dr. N.R. Dhar at Shila Dhar Institute, Allahabad, had initiated experiments on various ways of combining organic and inorganic compounds way back in the thirties and forties. Unfortunately, interest in organic agriculture waned with the advent of the so-called Green Revolution. I have reviewed post-graduate research in five disciplines and you will notice the striking knowledge gaps (*listing was enclosed, Ed.)* . There are two other places where experiments on organic non-chemical based agriculture are being planned. Both these colleagues would be interested in getting your newsletter and also hearing from Bernard and M. Pimbert. India has had a long tradition of experimentation with local materials; how else has this civilization survived?

Bernard of Auroville need not be disappointed. K.M. Munshi, former Food and Agriculture Minister, gave a lecture in 1952 to the Indian Council of Agricultural Research general body, entitled, "The Gospel of Dirty Hand", linking soil with soul.

I am sure some more experiments will be taken up on this subject. I will talk to Dr. Janakiraman, Director of Research, Gujarat Agricultural University, Anand, about it. Send him your newsletter with my reference. He can initiate experiments.

Two contacts are: Dr. R.C. Varma, Chairman and Managing Trustee, Choithram Fountain of Humanitarian Services, Charitable Trust, 32, Bairathi Colony No. 1, Indore, 452 004 (M.P.) and Dr. G.P. Gupta, Village and P.O. Gangagadh, Tehsil Kurja, District Buland Shahar, U.P. India.

G.P Gupta did Ph.D. under Dr. N.R. Dhar in 1950's and is now settled in a village to revitalize social, spiritual and technological life of the villages. Both he and I were born in the same village, and incidentally, he happens to be my father. He retired as Joint commissioner, Ministry of Agriculture, Government of India.

Anil K. Gupta
Indian Institute of Management
Vastrapur, Ahmedabad - 380 056

Upjau Would Like to Export to U.S.

Thank you very much for your valuable assistance and sending me the report on *Remineralize the Earth*. I am busy in establishing my market of Organic Fertilizer – UPJAU. I am keen on establishing a market for UPJAU in the USA. Please advise me in this context.

Basant Agarwal, Director, Essex Exports Pvt. Ltd.
150, Sarai Julena (2nd Floor), Okhla Road
New Delhi – 110025, India

Greens in Sweden Advocate SR

The Greenhouse affects us the opposite way from in the USA. Our winters, the last three, have been much warmer than ever recorded, with lots of new problems for Nature and us humans. Our Environmental Party, The Greens, has now printed in the party programme that we will remineralize our soil. They also speak about remineralization in the Swedish Parliament, and this is a good beginning. With best regards to all environmentally interested people in the USA and all the world from us in Sweden.

Bertil Eriksson
Elgboda, 74100 KNIVSTA , Sweden

From Scotland

We had to move house, and garden, in June '87 as the farmer was selling up. Our new garden was neglected, full of couch grass, buttercups and dockens – which looked like a reasonable green manure crop. Within 2 or 3 weeks we had spread 10 tons of silt, chopped up the dockens, had it plowed, then sowed agricultural vetch and radish seeds. During autumn we chopped up the vegetation, spread another 10 tons of silt and had it ploughed again.

Each time it was plowed, the farmer ploughed into the centre to make a giant raised bed, first from E to W, then from N to S. Since then I've incorporated lots of greens with some clay, basalt and one other dust. During the last 3 growing seasons each consecutive crop of fruit or veg has been 100% up on the previous year. I'm looking forward to even better results this year after incorporating basalt dust last autumn.

There are now some 70 trees where before there were none - some young saplings given to me and some grown from seed - oak, ash, beech, sycamore, maple, willow, rowan, elder, hazel, apple, pear, plum, cherry.... I'm growing most of my family's fruit and veg around the young trees, fruit bushes, herbs and flowers.

I've been digging each year, so far, each time shallower than before, each time incorporating some rock dust and some sort of vegetation. I'd love to see a cross section of the top 2 feet of soil. By this autumn most or all of the garden will be no digging. Each year I let some of all my vegetables flower and make seeds (I've built up a good store of seeds in the soil). This year, without digging, I'll be able to spend more time with my family of young Earth Remineralisers — 4, soon to be 5.

Remineralize the Earth arrived a few days before I was invited to speak to the Scottish Organic Gardeners who are holding their annual conference locally in November.

Cameron Thompson
Auchterhouse, Dundee, Scotland

Business Feasibility Study for SR in Canada

Some good news from this front!

Business Consulting Services of the University of Saskatchewan here in Saskatoon have agreed to do a feasibility study on remineralization, starting the beginning of May. It should not be surprising if you are contacted as a source of information and reference. Any information and help that you may be able to supply would be greatly appreciated.

Derek Mitchell
Saskatoon, Saskatchewan, Canada

IN THE U.S.

A Local Source of Rock Dust for Mt. Mitchell?

I am able to get a mixture of dust, fine sand and gravel from a mixed river rock source. If I could sift out the 10-20% powder, it would help our and our neighbors' gardens and could facilitate some experimentation on dying trees at Mt. Mitchell, Pisgah State Forest, N.C. We know the dust is effective from our garden and pot tests. I'd like to track down the equipment and process needed to sieve out the finer powder quickly and easily. Perhaps a sieving process would help others of us with similar rock dust sources.

Mike Kolodny
PO Box 772
Micaville, NC 28755
704-675-9181

Editor: This is a wonderful idea. Perhaps you can get in touch with the EarthDance Institute. If a mineral analysis shows this material to be suitable, then it is very important to also try remineralizing with a local source in generous amounts and see what the results are on Mt. Mitchell.

In Brixlegg, the forest where research has recently been done on a dying forest in Austria by George Abermann; the results were dramatically positive and in an extremely short time; changes were documented within five months, instead of the expected 18-24 months). They used a diabase rock and a much larger amount than that used at Mt. Mitchell by EarthDance. The amount and kind of material was more along the lines John Hamaker advocates and I do think it would be wonderful to try a glacial gravel type material in large amounts on a small part of Mt. Mitchell also and compare the results with the Planter's II chosen for the experiment. This would give a good idea of what works, and what is the best strategy ultimately for remineralizing the rest of Mt. Mitchell.

Cyclone Pulverizer Provides 40 Tons for Organic Farm

Dr. Alan Kapuler is very excited about our development of the CyclonePulverizer. He writes articles for his own *Peace Seeds* research journal and for *Country Life, Harrowsmith* and *In Good Tilth.*

We are going to make 40 tons of rock dust for John Sunquist's organic farm. We shall plant with and without rock dust and make films of the crops as they grow, to prove the value of soil remineralization. Wow!

Just got another wonderful letter from Don Weaver. All of you are so wonderful to help us and give us even more enthusiasm in our efforts. Thanks a million!

Jack Buker
Centrifugal Force, Inc.
Eugene, OR

(Editor: see article on the ***Cyclone Pulverizer****, page 16)*

Kudos for N-VIRO

I just received my first issue of *Remineralize the Earth* and have never read a more info-packed and inspiring work on regeneration. Congratulations on a true work of art! I'm a freelance writer and would like to learn more about N-VIRO for a piece I'm writing on water treatment/waste disposal. Where can I write the developers/marketers of N-VIRO for more information? Who can I write in Toledo to learn more about their experience with this technique?

Gordon Swan
Cary, Ilinois

Editor: We were sorry to have left out such vital information with the article! It is N-VIRO, 3450 West Central Avenue, Suite 328, Toledo, Ohio 43606, 1-800-66N-VIRO, (419) 535-6374. The President is Pat Nicholson, and Chris Mahoney is the National Sales Representative. They publish "RCRA Review, A Newspaper For Beneficial Utilization, Waste Minimization And Recycling!" The address is RCRA Review, 4444 W. Alexis Road, Toledo, OH 43623.

Critiquing the Bierman Project

Regarding the research project, I think that Stephanie Bierman's article is a great idea in principle. While according to the methods of linear science, limiting research to one variety of carrot is careful and proper, it has built-in limitations. Certainly the same variety of carrot needs to be used in the remineralized and control plots. However, if all research pertains to the same variety of carrot in all remineralized and control plots done by every backyard researcher, then the only information we have gained is whether or not that particular variety responds quantitatively to applications of stone meal and, within limits, by how much.

We know from studies of lead uptake in vegetables grown in urban soils that different varieties of the same vegetable have different rates of uptake. We can expect different responses from variety to variety to be likely in the case of SR as well. Had we encouraged each backyard researcher to use any variety of his/her choice, so long as it is the same for both remineralized and control plots, then perhaps we would get some inkling as to which carrot varieties best respond to remineralization.

Judging from the effectiveness of carrots in uptaking whatever is in the soil, I suspect that they are a species particularly sensitive to SR. To give a balanced view, it might do to research leafing and fruiting vegetables as well. Also there are other factors. What is the comparative disease and pest incidence on the control and remineralized plots? Does remineralization enhance nitrogen fixing and activity of other soil symbiotes? I suspect that in some cases, but not all, disease/pest resistance is improved by SR and that for some types of stone flour, activity of nitrogen-fixing bacteria and mycorhizzal fungi will be enhanced generally.

Another variable with unpredictable effects is the style of gardening and the condition of the soil. For example, even conventional organic gardening is likely to increase soil organic matter and microbial life compared to chemical gardening. Excellent soil from long term loving care by an organic gardener possibly will mask the effects of stone flour – or possibly, because of the high level of microbial action, it will amplify the results. Soil previously used for lawn or bare builder's fill left from recent construction, etc., will all have their own response profiles.

According to Hamaker's thesis, with which I'd agree in this case, highly organic, microbally active soils will make *best use* of remineralization. This might be seen only partly in enhanced yields because yields are high anyway, but perhaps in nutritional difference, the most important of which (aside from nitrate concentrations) might be very subtle in terms of measurement. These would be the presence of enzymes which require for their production that the plant has access to trace quantities of certain elements in accessible form. Indeed, stone flours probably show vast differences in their content of such elements in forms that microoganisms and fungi can make available to the crop plants.

Finally, for this research to be consistent with the balance of its methodology, the carrots from all beds would all be harvested at the same time. Thus many gardeners, who after all want fresh carrots throughout the season, and not 200 lbs. of them all at once, will be encouraged to cheat. (A fruiting crop, such as tomatoes, solves this problem as people can pick and weigh the tomatoes as they ripen, so they have a steady supply.) There are of course ways around this – pick a certain percentage of each bed whenever you harvest carrots during the season. Or plant your own carrots, possibly using a tastier variety than Imperator, outside of the research plots.

Still, the methodology cannot account for growing techniques such as interplanting, progressive thinning as a harvest technique, etc. Also, to be truly indicative, the person who sows and cultivates the carrots should not know which beds have been remineralized. Otherwise, the results of research by readers of your publication will be hopelessly biased in favor of remineralization.

Dan Hemenway
Jacksonville, FL

Stephanie Berman Writes About Her Project

(See Re #1, Page 36)

Dear Reader,

One year ago I worked with several other people to put out a packet of experiments on various agricultural techniques mostly found in Chris Bird and Peter Tompkins' book *Secrets of the Soil.* The hope was that volunteers could gather data that could be collected together, as it seemed that a greater body of scientific and practical data was necessary for our culture to employ these new techniques. Sharing successes and failures of these experiments means that all of us can profit from a larger collective understanding and progress much faster, hopefully permitting them to be adopted by organic growers, and hopefully later by mainstream agriculture.

Initially, our group thought it would be necessary for a major university to back our experiments. But after seeing that there was little interest in truth, per se, only in maintaining a mediocre status quo, I have personally abandoned that aim as I found little honesty in the "system". Now if we amass irrefutable evidence, then they might be interested in cashing in on it, or perhaps suppressing it, but at best duplicating what had already been proven. What really matters, I feel, is whether we really understand how this works well enough to recommend it to a farmer or gardener, and be certain that the results will be positive.

So for this purpose, I feel in retrospect that the experiments were far too cumbersome for some people who are doing this on a volunteer basis and only in their spare time. Let me say that for a scientifically valid experiment, one needs to have a control and a test plot, and preferably more than just one of each. The more test plots, the better the data base. If one uses the same variety and species, the results are comparable. That is the criterion for science. But for our knowledge, if we get positive results with a variety of species, or we don't, but are led to investigate why we did not, then for myself I would be happy with that.

In regards to rock dust, although Bob Cannard gets wonderful results, a friend of his put some expensive "very good" rock dust on his organic orchard, which was doing OK before he did. The trees with the rock dust got a fungus infection and he lost his peach crop. His soil was very good and fertile before he started. The question is, why did this happen? *(Editor: Without knowing the source of the rock dust, rock type, a mineral analysis, and the amount added and how it was applied, it would be hard to speculate on what could have happened)*

In another case, a woman with a garden in the Southwest applied rock dust from a local quarry, and her crops and trees did not do well at all; in fact she even lost some trees. She felt that since the soil in the Southwest is very alkaline, that the rocks themselves in the dust may have been alkaline, and thus the combination increased the total alkalinity and was very deleterious for things growing in the soil. She is going to change the experiment this year, using different types of rock, and I suggested using some oak mulch to increase the acidity. Since she would have three variables, she will need three plots at least: one with rock dust, one with nothing, and one with rock dust and oak leaves, in order to truly determine what is happening.

This experiment brings up an important question. We know that rock dust does very well in soils which have been made acid by acid rain, as well as soils which are depleted. Does rock dust work best in an acid environment? If so, how acid? Can any degree of alkalinity be tolerated? Are certain rocks more acidifying or alkalizing than others? It seems to me that testing the pH of soils before and after the application of rock dust, and at the end of the season is very crucial. Also, perhaps a solution could be made from the dust itself, and that tested as well. Good quality litmus paper ought to do just fine.

I find it exciting that we have a direction to go in, which is more than we had last year. I would like to take this opportunity to thank all of the people who have done experiments, or who have helped in other ways on the project. I want to encourage you, in that whatever you do, if your results are shared, you will be helpful regardless of what those results are.

Stephanie Bierman
2512 Ninth St., #17, Berkeley, CA 94710

A Stockholder's Corporation

I am very happy to see that the remineralization organization is alive and well. I have never dropped rock dust from my heart, and I was just waiting for it to be rekindled again, in the form of the new ***Remineralize the Earth***. I am happy to be a part of your Network family, and will continue to be.

I sent a letter to David Yarrow, detailing a procedure by which we can start a corporation, in which remineralization networkers could be stockholders. A Stockholder's Corporation would be formed with 1,000,000 shares to allow for future growth. Stocks would cost $10 per share and would be sold to networkers via the mail (certified or registered). With very careful management and impeccable accounting, this money would be used to start an organized program to buy only excellent rock dust, and to provide it free of charge to farmers willing to enter our "Participation Project". *(Editor: This would involve participating in controlled studies with rock dust.)*

Imagine how exciting it will be for each networker to see in ***Remineralize the Earth*** the latest reports, the worth of their private stock shares and how the company is doing. I'll tell you, there's nothing like money to get people excited. People make money every day doing harmful things to Mother Earth. Let's make money doing good things for Mother.

After a while we can branch out to lobby state, federal and municipal governments to give us contracts to remineralize great tracts of forests and national parks, state and city parks, etc. Let's use this technology of convenience for our benefit and for the benefit of Mother Earth.

Ron Kastle
P.O. Box 61, Rosedale, NY 11422

In the *Stockman Grass Farmer*...

I have read portions of John Hamaker's book, *The Survival of Civilization,* and would appreciate a copy of the article "A Rock Dust Primer". I have a small dairy operation in central Kansas. I am attempting to cycle my cows so that they all freshen in February, which will allow me to graze intensively throughout the entire lactation. The *Stockman Grass Farmer* gave a nice write up about your work in their March 1991 issue. Thank you very much for your help.

Kenneth King
Hutchinson, KS

I am presently a subscriber to *The Stockman Grass Farmer* paper, and was interested in an article called "Beware the Magic Bullet" by Roger Wentling (March 1991). In it he speaks of your magazine and rock dust. We are currently switching to intensive grazing systems and are very interested in building the soils we have.

Andy Glaze, D.C.
Gilmer, TX

Editor: We have received more than 50 requests for information from this Stockman Grass Farmer *piece, a record response for a single article. Thank you, Roger. The Stockman Grass Farmer, 5135 Galaxie Drive, Suite 300C, Jackson, MS 39211.*

And In *The Vermont Standard*...

There was an interesting article called "Touch the Earth" by Connie Fitz in the *Vermont Standard* newspaper, Woodstock, VT on Jan. 4, 1991. The article's topic was "A New Worry: Another Ice Age". In reading it I found a reference to your newsletter. Since we are gardeners and also owners of a small gravel plant, I would like more information on this topic.

Ardis M. Close
Norwich, VT

The Iceman Cometh....

I bought a copy in Denver (Larry Ephron's book *The End*) and left for Chicago...Milwaukee, New York, Norway, Sweden and Denmark, and a lot of towns inbetween...all of this time never keeping my mouth shut about this book I had just read. I have been given a variety of nomenclature because of it: "Doomsday Prophet", "The Ice Man", etc.... met a lot of people, and one of them, Ingemar Karlsson, (Trottagården, Uråsa, Våckelsång, Sweden) just wrote me a letter saying he had done some rock dust application last year and his harvest was excellent. I'll bet he would be real proud to have one of your newsletters. My congratulations on everything that everyone has done.

For the past year I have been starting a garden on the south side of Crowell Mountain in Northwest Arkansas. Quite a change from downtown Copenhagen No electricity or plumbing. Wood heat, shelter, tools, food, chickens, compost, manures, sunlight, water seeds and rockdust.... The rock dust that I used came from a local quarry, whose owner has all the machinery to render rock to the 200 screen. Thirty acres is a large place when one attacks it with a shovel, nevertheless, some 30 odd peach and apple seedlings were planted. Several pits have been dug, two of them 6' x 90' long. Dusted or not, they will be planted this spring.

Steven, Falls Last Flower Farm
Canton, Arkansas

Stones

We can throw stones,
We can complain about them;
We can stumble on them,
Climb over them
Or build with them.
And we can renew the earth with stones.

Fr. Philip Kelly, OSC
N. Dartmouth, Massachusetts

Trace Minerals From Sea Salt

Thank you for your work in publishing and editing *Remineralize the Earth*, which, as a new subscriber, I much enjoy.

I have a longtime amateur interest in the human nutritional response to dietary supplementation with trace minerals from sea water. As your various authors and researchers indicate, trace minerals have ben leached from the soil for the past ten million years. It follows that such trace minerals have found their way to the oceans. Depending upon the location, I understand that 15% to 30% of the minerals in sea water, after allowing for 70% to 85% sodium chloride – consist of trace minerals.

Natural sea salt, containing all the trace minerals contained in the sea water from which it is made, has been shown to cure many of man's ills. At least one researcher postulated that 95% of human ills are attributable to trace mineral deficiency. Presumably, were these trace minerals reintroduced into the diet, either directly from sea water extraction or indirectly from consumption of food grown on remineralized soil, this process could be reversed. Just as introduction of trace minerals into soil causes explosion of microorganism production, the introduction of trace minerals into the gut causes increase in microorganism reproduction. Just as the roots of plants digest the microorganism in the soil, the animal digests the microorganisms which have digested the ingested food.

The chemical companies which manufacture salt from sea water extract the trace minerals – valuable elements sold for use in multiple industrial products and processes – and sell the sodium chloride residue (waste?) as table salt. As you may know, this same industry has been instrumental in defining what constitutes "salt" for human consumption in the United States and which, consequently, is defined by statute to limit the content of trace minerals in "salt" to approximately 2.5% of total.

The question I ask is whether there exists an economical process by which the trace minerals can be removed from sea water while leaving behind the sodium chloride. I inquire as to whether any of your contributors or readers have information in this regard.

William H. Taylor
1718 Gascony Road
Leucadia, CA 92024

Another Convert to Remineralization

I thought I would take a moment to thank you for your efforts in publishing the ***Soil Remineralization*** Newsletter. I feel kind of like a kid with a new toy. I have been aware of SR for a couple of years now, through my study of Natural Hygiene, but I was skeptical and I had some reservations about the theory of SR. However, through some trips to the library and some additional research in soil biology, I have now become "a believer"!

Though I am just a home gardener with no great designs on remineralizing the planet, I thought you might like to know that you have another compatriot.

Todd Garrison
Spring City, Tennessee

I am teaching an organic gardening course in the Rochester, NY area this spring, once for the Rochester Museum and Science Center and once for Greece Central School Continuing Education. One subject I intend to cover is the use of rock dust.

Kirsten Bartles
Dansville, New York

We are going to have a Regeneration Center and I will be selling Azomite (Ed: probably Elemite) Rock Dust Fertilizer in Wyoming.

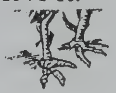
Oleta Thomas, Center For New Life
3251 Brookview Drive, Casper, WY 82604,

I have just completed reading *Secrets of the Soil* by Tompkins and Bird. As an environmental professional in industry for the last 20 years, I am very concerned about what our society has done to the lifeblood of our Earth. I live on 13 acres of East Texas piney woods forest near Houston and am interested in using techniques mentioned in the book to demonstrate to the local "chemical intensive" folks that there are alternatives to their technologies.

Michael Jackson
Magnolia, Texas

Chickens Love Rock Dust

After reading *Secrets of the Soil* I just purely have to put some of the ideas into practice. We already utilize a considerable amount of rock dust which is readily available from a gravel plant not too far away. It must be good because even the chickens love it.



Bill Tisher
Scio, Oregon

Small Lab Size Grinders for Testing Rock Dust

A small electric rock mill (laboratory size) for pulverizing is "MC 170 Miracle Mill" $69.95 plus $4.00 shipping from: Bill Beebe, Box 49472, Colorado Springs, CO 80949.

Plans for a "Manual Crusher & Pulverizer" for small amounts of rock dust for sampling are available for $9.95 from: R.G. Tech Publications, 1316 North Edgemont, Unit 108, Los Angeles, CA 90027.

Jan Brewer
San Luis Obispo, California

I got your name from *Secrets of the Soil* by Peter Tomkins. I am a son and a grandson of farmers, but never had any interest in it or in the soil until recently. I am retired, and now have time to devote to attempting to correct some devastating actions taken by us humans and begin to purify this planet. I expect that you are so motivated as well. You and your newsletters may help me to help the cause.

Don Payne
Colorado Springs, Colorado

Your approach to this new issue is very encouraging and most professional. Even though I have as yet to get into a program utilizing rock dust, I still appreciate the great amount of work that this new copy represents.

I have finally received 140 lb. from Mark Williams quite some time ago, and set up a pot test two times. Results were really nothing. Plan to do another pot test soon. I hope that I can approach local quarry operators in this area. Page 36 *(RE #1)* stated that "Asphalt manufacture requires that rock be ground to 200 mesh screening, and this is perfect for rock dust." This was news to me, and perhaps I can approach the operator and ask questions that are meaningful in respect to this product.

George Myers
El Paso, Texas

In Western Massachusetts you can find *Remineralize the Earth* at McCusker's Market in Shelburne Falls and Apple Tree Books in Lee.

A grapevine for subscribers–
to network and communicate
with each other about SR

The Network

Subscribers are invited to join the listing. Please contact us so we can include you. For a complete and current list add these to the larger list in RE #1. SR = soil remineralization.

Raymond Ackerly
PO Box 213
West Fulton, NY 12194

Phil Anderson
310 Wellesley St. East
Toronto Ont. M4X 1H1 Canada
(416) 964-3659
Am an organic farmer and on the Executive Board of Canadian Organic Growers and Canadian Co-Ordination for *People For a Future.*

Stephanie Bierman
2512 9th St. #17
Berkeley, CA 94710
Interested in people's truthful accounts of their experience with rock dust – when it worked and when it didn't work, and with what soil conditions, climate, etc.

Biogenic Resource Foundation
Peter James Waskiewicz
1605 Tennessee #A
Lawrence, KS 66044
Actively networking SR, community dev. and biogenic nutrition. Organizer of the Kaw Valley Health and Environmental Conference, Sept. 28, 1991 w/ Viktor Kulvinskas, Joanna Campe and Michael Klapper M.D. Seeking wholesale distributors for Super Blue Green Algae in your area.

Steven Joshua Blue
Hawaiian Health Research Center
53-147 Kam Hwy.
Punalu'u, HI 96717
(808) 237-8445
A Natural Hygienist since 1985, I have been counseling individuals about Life Science, developing my own organic garden using basalt rock dust from here in Hawaii, and working with a small group to implement a "world-class" health retreat/ agricultural research facility on the Big Island of Hawaii. I am currently researching the marketability of rock dust in Hawaii.

Piet Bouter
c/o RE
152 South St.
Northampton, MA 01060
Contact me through the magazine. I am available to remineralize wherever there is a grinder.

Dr. Pierre Cloutier
132 Jean Baptiste
Chateauguay, QC J6K 3B2
Canada
Local sources of rock dust appreciated. Translation of original articles underway. Interested helpers should contact me.

Daniel L. Collins
P.O. Box 369
Dillsboro, NC 28775
Soil sampling and rock assays.

Nick Consoletti c/o Stalling
1825 SE Morrison #1
Portland, OR 97214
Learning the art of dialogue (such as Dr. David Boehm); interest in Bucky Fuller's geoscope, a tool that makes it possible to model Earth as a whole.

Todd Franz
2461 American River Dr.
Sacramento, CA 95825
(916) 485-1352
Interested in SR experiments with plants and animals; going into business soon.

Michael Greenblatt
11 Stuyuvesant Circle E.
Setuket, NY 11733
(516) 751-7416
Looking to find more ways to get involved in SR process, to bring it into more public view.

Michael Hamilton
1513 Highland Ave.
Chicago, IL 60660
(312) 338-2544
I would like to distribute rock dust on an experimental level in Chicago.

Frank Hartman
2130 SE Elmhurst Rd.
Port St. Lucie, FL 34952
(407) 337-9219
We have formed a Florida remineralization group on the East Coast at the above address. We are also working with the Bio-Dynamic methods of Steiner and Electro-Culture.

Dan Hemenway
Elfin Permaculture
7781 Lenox Ave.
Jacksonville, FL 32221
Leading three week permaculture design course Oct. 18 - Nov. 9, 1991, at the Granary, Orange Park, Fl. Course grads certified as Permaculturee Design Apprentices and registered w/ Permaculture Institute. Send self addressed stamped envelope for pre-registration packet.

Dick and Mary Hogan
Grailville
932 O'Bannonville Rd.
Loveland, OH 45140-9705
(513) 683-2340
Village services – sustainable systems design engineer/permaculture consultant/practitioner. Community supported ag/gardens at Grailville (Intl. Women's Ed. Center and farm.)

Ronald L. Jantzen
160 Maple St.
Sherborn, MA 01770

Berjig Javian
17 Addison St.
Arlington, MA 02174
(617)643-4522

Roger, Gail & Melody Kahane
72650 London Road
Cottage Grove, OR 97424
(503) 942-DUST

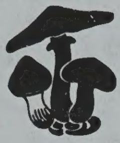
Ron Kastle
PO Box 61
Rosedale, NY 11422
(718) 528-2870

Troy A. Konnick
Ground Force International
1928 NE 154 Street #212
Miami, FL 33162
Source of rock dust.

Harvey C. Lisle
4427 State Rte. 601
Norwalk, OH 44857

I will be willing to answer questions on "living minerals", dowsing and Biodynamic Agriculture.

Tom Lonsky
RD 1, Ledyard Road
Genoa, NY 13071
(315) 364-8568
Earth man, seeking the timeless wisdom of my planet.



Robert F. Miller
340 River Road
Glenville, MN 56036

Jeremy R. Nash
Jarramarumba
Bostobrick Vi Dorrigo
NSW 2453, Australia
I am a kiwifruit orchardist and beef farmer with land partly covered by semi-tropical rainforest and hardwood (eucalyptus) forest, partly cleared for farming, and the whole is leached by high summer rainfall (60").

Michael Kolodny
P.O. Box 772
Micaville, NC 28755
Experimenting on our raised garden beds and hope to do forest/orchard work with rock dust; have local dust source contacts. Presenting the theories and information occasionally as an evening lecture/video/discussion.

Ken McNamara
P.O. Box 3142
Taos, NM 87571
(505) 758-4974
Want to make gravel crusher. Need plans for machine, funding (if possible), and advice.

Marian Rose
214 South Main St.
Brattleboro, VT 05301

Stephen
Falls Last Flower Farm
Rte. 3, Box 2693
Clinton, AR 72031

Carolyn Touryniere
P.O. Box 393
Slippery Rock, PA 10657
Researching soil remineralization.

Manifesting Dreams Into Reality for *Remineralize the Earth*

What You Can Do To Help

We are happy to announce that we have a fine distributor for the magazine, New Leaf Periodicals. Please let your local health food store and book store know they can order the magazine and carry it through New Leaf Distributing Company, 5425 Tulane Drive SW, Atlanta, GA 30336-2323, WATS 1-800-326-2665 or, FAX 1-800-326-1066.

I would like to establish a non-profit organization with a Board of Advisors which would produce ***Remineralize the Earth*** magazine. This would lend substance and a firm foundation to the remineralization movement, magazine and all projects and initiatives. This would facilitate accepting donations and seeking grants. We have been offered a monthly donation if we get non-profit status. It would also make possible cheap bulk mailing rates for larger circulation to promote the magazine and keep mailing costs down.

The cost for a lawyer plus application fees for non-profit status will cost $12-1500. We have been advised to open a bank account for ***RE*** earmarked "***RE*** Non-Profit Inc. Fund." We would ask those who wish to support us to send us a loan by check. We would pay back the loan and accept it back as a donation which can then be deducted from your income tax return as soon as incorporation takes effect. Contact us for more information.

Suggest to your favorite relevant publications that they write an article about us or network the magazine in a column or other resource info section.

Invite your local newspaper to cover remineralization or networking activities you are involved in locally.

Give a subscription of ***RE*** to your local library.

Any other suggestions to help us get the message out are much appreciated!

James G. Williams
860 S.W. 21 Street
Boca Raton, FL 33486
Own a small timber farm in central Virginia and an interest in a corn and alfalfa farm in central Oklahoma. Just trying to get started in non-chemical farming.

Fred B. Wood, Sr.
2346 Lansford Ave.
San Jose, CA 95125
(408) 723-7818
Member of Earth Regeneration Society, Earth Regeneration Corporation, and Computer Social Impact Research Institute.

Sandra A. Wood
Vulcan Materials Company
P.O. Box 530187
Birmingham, AL 35253
(205) 877-3798
Vulcan Materials Company owns and operates over 120 construction materials quarries. Limestone and granite aggregate fines are produced in most all plants located in 15 states throughout the U.S.

Gary Zuckett
Box 144
Purlman, WV 26421
We operate the L.I.F.E. Health and Conference Center and are starting an intentional community. We're interested in info on a machine to crush rock.

We regret that through an oversight several new networkers for this issue were not included, but will appear next issue.

New Earth™ Powdered Gravel

Powdered rocks and gravels must be digested by the microscopic soil life (fungi, bacteria...) before the minerals become available to plants. Results from the use of rock dust can be quite unpredictable for that reason, due to the variability of conditions. It takes time to wear out a soil, or to restore it.

Many factors can affect the digestion or activation of rock minerals. The soil life is greatly influenced by soil temperature, moisture, aeration, and so forth. When conditions are good, the powdered gravel can produce fast results; even with the first crop. When conditions are not so favorable, it may take longer to get a plant response.

The following are some examples of what we've found, under somewhat favorable conditions, using New Earth powdered gravel. It is ground from a multi-colored river gravel, which helps insure that it is "well balanced" (having a broad assortment of minerals, in proportions like the crust of the Earth, on average). An analysis is available on request.

Sweet Corn

To find out how Gravel Dust would compare to a fancy chemical fertilizer (such as Miracle-Gro), we did a little experiment. We took three large pots (11" in diameter), and filled them with "good" soil from an organic orchard. One of these pots was left plain (as the "control"), one was given the recommended dose of chemical fertilizer, and the third was given a half pound of powdered gravel, mixed with the soil.

Sweet corn seeds were then planted in the pots, and when the plants were a couple inches high, we thinned them to three equal sized plants per pot.

Every week, the pots were watered, equally, and the "chemical fertilizer" pot was given it's weekly dose. After six weeks, the experiment was discontinued because the gravel dusted plants were getting to be too big for their pot! The three plants grown in the plain soil were quite small. The three plants grown with chemicals were almost twice the size of those. But the gravel dusted plants were even bigger – 30 to 50% larger than the chemical plants. Pretty amazing, considering the fact that they did not have any added nitrogen fertilizer (like the chemical fertilizer contained).

Cherry Tomatoes

In another case, we planted a young cherry tomato seedling in a garden bed that had had much gravel dust added the year before. It was August (a little late). A few months later, in November, that single plant had grown to over 14 feet in diameter, and was loaded with 1" cherry tomatoes – over 70 pounds worth. They were all indescribably delicious; the best tasting tomatoes we had ever eaten.

Most importantly, those tomatoes were so packed with real nutrition, eating just a small handful of them was completely satisfying as a meal (in other words, there was no desire to eat anymore of anything, for hours afterwards). Think of what this would do for people who are trying to lose weight.

Frozen Lettuce

In December of 1989, we had a record breaking cold spell one night; it got down to minus three degrees. Yet some completely exposed lettuce seedlings, growing in a bed with a lot of gravel dust mixed in, went right through that cold spell, unharmed. Actually, they were frozen solid the next morning, but later, after thawing out, they went on growing, never showing the slightest signs of damage.

Picky Mules

For a period of several months, a pile of powdered gravel was left alone, out in an open area. A stand of weeds, mostly grasses, grew up around the pile, lush and green. A dozen feet from the rock dust pile, another area had equally tall, lush grass. That area had been treated with manure, not powdered rock.

At this point, with the grass in both areas looking equally good and healthy, several mules were turned loose to graze. They were not fooled by mere appearances. The mules ate the twenty inch tall grass which was growing around the rock dust pile, right down to the ground. They did not eat the equally tall grass growing in the manure fertilized area.

Apparently, they could smell, or perhaps taste, the difference, immediately. The manure fertilizer (and worse yet, chemical fertilizer) throws the chemistry of the plants and crops out of balance. That's very undesirable.

Earthworms

Without knowing what would happen, we spread a pound of Powdered Gravel on the surface of the soil, around a plant in a garden bed.

The very next morning, we noticed that the Gravel Dust was completely gone! It had been applied in a fairly thick layer; about an eighth of an inch, yet there was not a trace of it left. A closer examination revealed that, where the Gravel Dust had been, there were now hundreds of small holes in the soil surface. The mystery had been solved; earthworms had discovered the dust during the night, and had eaten it all up – a pound of it! The worms aren't as dumb as we thought! To help "activate" the dust, we should feed them all the powdered rock they can eat!

New Earth™
Route One
Horatio AR 71842
(501) 832-2444

RESOURCES

Remineralize the Earth is available in larger quantities inexpensively to subscribers for conferences and discounted for sale in bookstores and health food stores. Please contact us for prices. Some past issues are available for $4.00. Ask about our ad rates.

SR Research Packet

Remineralize the Earth offers a Research Packet on remineralization research around the world including Germany, Austria, and Australia for forests, agriculture and orchards. Updated to include studies by Peter Von Fragstein at the University of Kessel, Germany and Ward Chesworth at the University of Guelph, Ontario and Dennis Eberl and Tung Ming Lai at Colorado State University. Send $15.00, $20.00 (outside the U.S.) to: *Remineralize the Earth*, 152 South Street, Northampton, MA 01060.

Hamaker WeaverPublishers

Order the book *The Survival of Civilization* ($12.00 ppd.) *The Solar or Ice Age? Bulletin #10* (366 pg.) Suggested minimum donation $10.00. CA residents add state tax. Hamaker Weaver Publishers, P.O. Box 1961, Burlingame, CA 94010. Tel (415) 347-9693.

People For A Future

To order the video *Stopping The Coming Ice Age*. ($32.95 ppd). CA residents add People For a Future, 2140 Shattuck Ave., Berkeley, CA 94704, Dial 1-800-441-7707 or (415) 524-2700 in California.

Earth Regeneration Society

ERS is an active and effectively organized network dealing with the stimulating and coordinating initiatives in scientific research and both governmental and non-governmental policy. They have available numerous scientific papers on climate and are dedicated to the implementation of an earth regeneration program.

President, Alden Bryant w/ Fred Bernard Wood, PhD. and others.
Earth Regeneration Society
1442A Walnut St. #57, Berkeley, CA 94709.

Bread From Stones, Dr. Julius Hensel. Health Research, Box 70, Mokelumne Hill, CA 95245. $6 ppd. Writings from the 1890's on stone flour for agriculture, recently compiled, translated and in a typed manuscript.

Ask your library to order these resources!

Subscriptions

You will receive an individual renewal notice with the last issue of your subscription. ***Remineralize the Earth*** is part of a community grass roots network that stretches to every continent. Writing is *contributed*. Subscriptions cover mailing and printing.

Our aim is to network around the world. Remineralization offers ecological self sufficiency in place of dependency on unhealthy chemicals, pesticides and herbicides. Remineralization needs to take place worldwide.

Printing a publication with a small circulation is relatively expensive. We need to raise the cost due to bigger issues and increased costs. We are offering a sliding scale to subscribers according to income. New rates for 3 issues are now $15, $20, or $25 in the U.S. (all issues sent first class). Overseas rates are $20 or $25.

If you cannot afford this amount and still wish to receive Remineralize the Earth, please contact us.

If you wish to exchange publications please contact us.

Thank you, readers, for your contributions: results of remineralization, photos, articles, experiences, and initiatives on a local or larger scale, be they commercial or cooperative — ***Remineralize the Earth*** is a reflection of all of you.

SUBSCRIPTIONS 3 issues/year for $15, $20, or $25 (U.S. First Class); $20 or $25 outside the U.S. * Send check payable to: REMINERALIZE THE EARTH , 152 South Street, Northampton, MA 01060, U.S.A. **Please print clearly. Thank You.**

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Reproduced from the Hamaker Coordination poster of Betsan Coats

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HAMAKER COORDINATION – Information concerning remineralizing the soil is organized internationally on a voluntary basis. We can all help to save our Earth.

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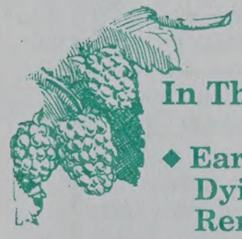

In This Issue:

- ◆ Earth Day Initiative: Dying Forests Remineralized
- ◆ The New Cyclone Pulverizer
- ◆ Bringing SR to Costa Rica
- ◆ Keyline Agriculture